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AIR POLLUTION IN CONNECTICUT. REPORT OF A COOPERATIVE SURVEY BY THE U. S. PUBLIC HEALTH SERVICE, AND THE CONNECTICUT STATE DEPARTMENT OF HEALTH, APRIL-SEPTEMBER, 1956

Roy O. McCaldin, et al

Robert A. Taft Water Research Center
Cincinnati, Ohio

1957

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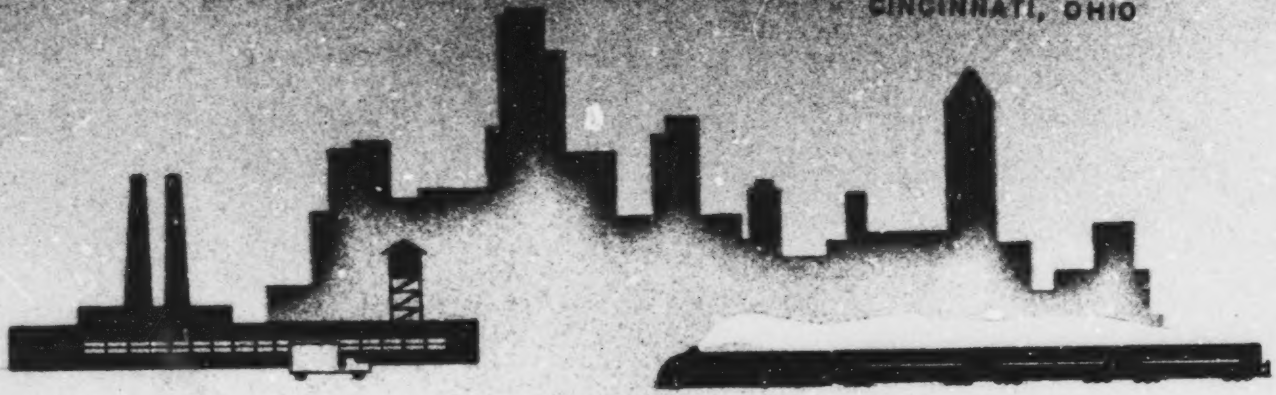

AIR POLLUTION IN CONNECTICUT

A JOINT REPORT WITH THE
CONNECTICUT STATE DEPARTMENT OF HEALTH

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AIR POLLUTION IN CONNECTICUT

REPORT OF A COOPERATIVE SURVEY BY THE
U.S. PUBLIC HEALTH SERVICE AND THE
CONNECTICUT STATE DEPARTMENT OF HEALTH

APRIL - SEPTEMBER, 1956

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Community Air Pollution Program
Public Health Service

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Connecticut State Department of Health

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

Robert A. Taft Sanitary Engineering Center
Cincinnati, Ohio
1957

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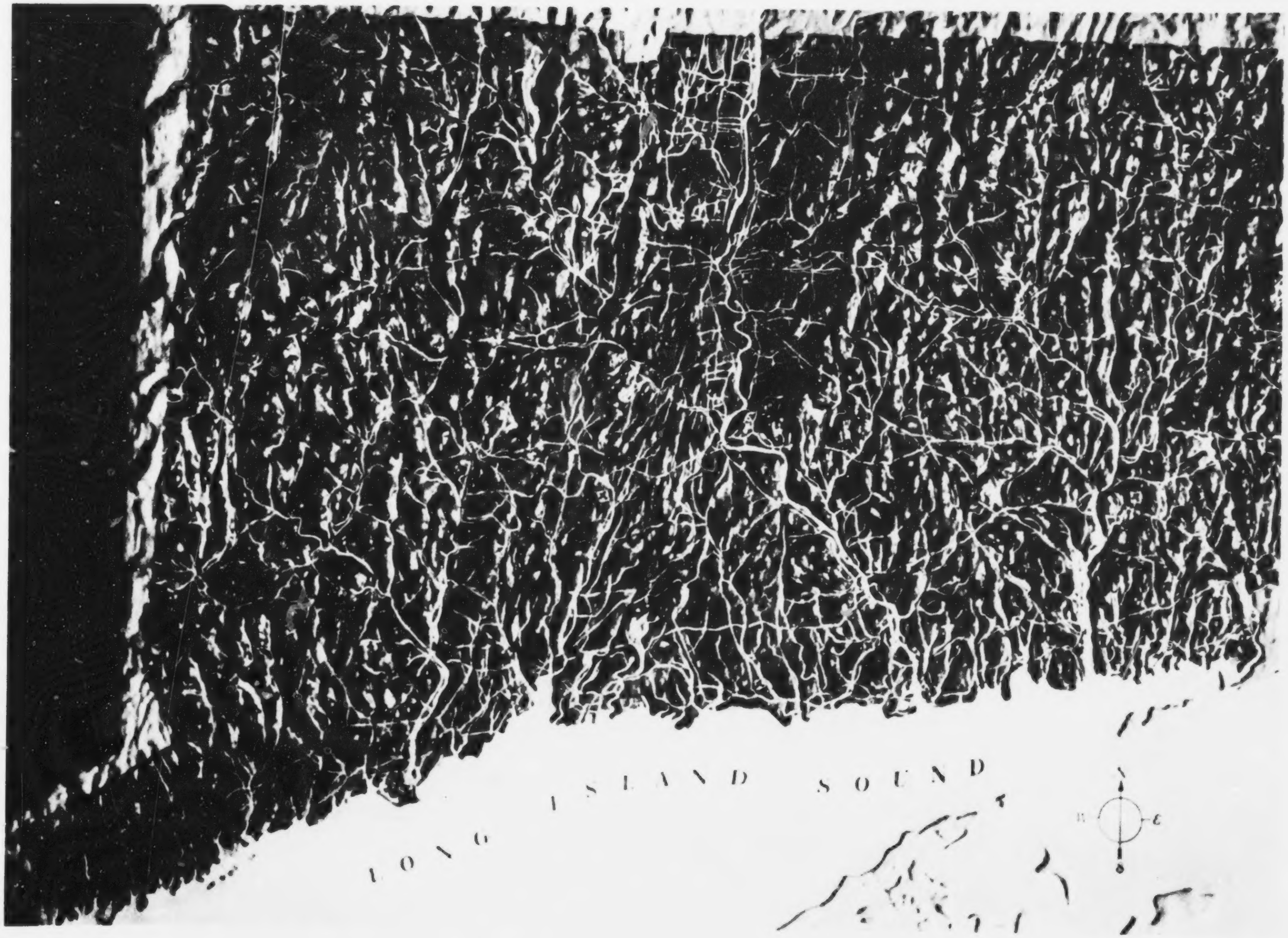
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SUMMARY

An appraisal of air pollution problems in Connecticut was made by the Public Health Service and the Connecticut State Department of Health to determine the status of air pollution in the State and the need for State activity in solving air pollution problems.

The study was made by analyzing available data, interviewing officials in the larger and selected smaller cities and towns, and sending questionnaires to the remaining communities. Interview and questionnaire data were obtained for 116 of the 169 cities and towns which include 2,051,960 people or 89.3 percent of the State's population.

The State is described with respect to population, topography, climatology, industry, transportation, refuse disposal practice, fuel usage, and use of radioactive materials. Air pollution factors are analyzed for the 25 largest cities and towns and their air pollution potential estimated. State and local air pollution laws are analyzed, a summary of local air pollution studies is given, and the State Department of Health records of air pollution investigations are examined.

In this survey it was found that:

1. Forty-five cities and towns with 69.9 percent of the State's population reported air pollution sufficient to cause discomfort or inconvenience to residents.

2. Of these 45 cities and towns, 17 with 28.7 percent of the State's population further reported property damage.

3. The 45 cities and towns reporting significant air pollution were screened as to severity of their problems. It is estimated that the air pollution problems are minor in 38 cities and towns with 56.3 percent of the State's population and that the air pollution problems are more than minor in seven cities and towns with 13.5 percent of the population.

4. Air pollution from industrial sources was reported in two-thirds of the cities and towns visited. This was caused by a wide variety of industrial sources, and no single type of industry was reported to cause air pollution in more than one-third of the cities and towns visited.

5. Almost half of the cities and towns visited reported an air pollution problem due to a burning refuse dump.

6. In one out of every five cities and towns visited, air pollution problems were reported to stem from sources in adjacent jurisdictions.

7. The State Department of Health, as a part of its regular sanitary engineering program, has been investigating air pollution problems since 1923. About 18 investigations of odor, smoke, or dust problems are made each year at the request of local health agencies.

8. Measurements of air pollutants, which might show their nature and concentration, are extremely limited in Connecticut.

RECOMMENDATIONS

It is recommended that:

1. Local agencies handle air pollution problems to the extent that their resources permit.

2. An agency be designated to represent the State in interstate air pollution activities or problems, and to work with the Federal Government whenever Federal participation in the solution of air pollution problems in Connecticut is requested or is appropriate.

3. The State, in cooperation with the local agencies responsible for air pollution control, develop a comprehensive program for the study and prevention of air pollution in the State. This would include base line studies of air pollution levels in various parts of the State; evaluation of problem areas and pollution sources with respect to present and possible future levels of air pollution; appraisal of topographical and climatological features of the State as related to air pollution matters; surveillance of environmental levels of atomic radiation; advice, recommendations and assistance to official local agencies regarding development of local standards and ordinances and their enforcement; and the collection and dissemination of information relating to air pollution in Connecticut.

4. The State furnish technical assistance as required by local agencies in evaluating and solving air pollution problems beyond the resources of these local agencies.

5. Procedures be established for bringing about the equitable resolution of air pollution problems involving two or more cities or towns.

6. Connecticut communities place particular emphasis on replacement of open refuse dumps with other disposal methods recommended by the State Department of Health.

7. Consideration should be given to the need for revision of or adoption of State and local legislation necessary to accomplish those recommendations contained herein which are acceptable to State and local authorities.

INTRODUCTION

AUTHORITY FOR STUDY

The Federal Air Pollution Act, Public Law 159 (84th Congress), states that the Surgeon General of the Public Health Service may, upon request of a State or local air pollution control agency, survey its air pollution problem and recommend a solution. This study is the result of a request by the Connecticut State Department of Health for such Public Health Service assistance in conducting an evaluation of the air pollution problem of the State.

PURPOSE OF STUDY

As communities grow in population and as industrial activity increases in amount and complexity, air pollution and the need for appropriate control measures will undoubtedly grow. Since Connecticut is one of the leading industrial States; is the fourth most densely populated State; and has the prospect of future population and industrial growth, it was deemed desirable at this time to carry out studies of the air pollution potential of the State to determine what further surveillance or control actions are necessary. It is the purpose of this report to describe characteristics of the State as they relate to air resources; present a description of air pollution potential in the major cities and towns; review examples of some of the current local problems; review the status of current local air pollution control efforts; and lastly, on the basis of this information, to recommend desirable future activities in order to maintain a healthful and comfortable air environment.

METHOD OF STUDY

State-wide information on population, topography, climatology, industry, transportation, garbage and refuse disposal practice, and heating was compiled from existing sources, where available. In order to determine the status of air pollution in the various cities and towns, visits were made to 35 cities and towns representing 72.9 percent of the State's population. Interviews were conducted with the local officials most closely connected with air pollution matters. The first interview in each case was with the local director of health and in most cases included health department sanitarians. Where indicated, representatives of building, fire, and public works departments and others were also asked for information. In the larger cities as many as four interviews were conducted. In the smaller towns one interview generally sufficed. Questions were asked regarding the occurrence of specific air pollution problems, how these are handled, the status of legal controls, and an over-all assessment of the problem. The interview notes were reduced to tabular form (Appendix B -Figs. 11 and 12). To survey the air pollution problems of communities not visited, a questionnaire (Appendix B - Fig. 13) was mailed to the appropriate local directors of health.

GENERAL DISCUSSION OF COMMUNITY AIR POLLUTION

It has been found difficult to define community air pollution in words acceptable to everyone. Some insist that it is the addition of anything to "pure air" but then find it difficult to define pure air. One of the most recent definitions, the one which is used by the Federal Ad Hoc Interdepartmental Committee on Community Air Pollution, reads in part as follows:

> Community air pollution is the presence in the ambient atmosphere of substances put there by the activities of man in concentrations sufficient to interfere directly or indirectly with his comfort, safety, or health, or with the full use and enjoyment of his property.

Concern about air pollution did not begin only recently as most people are inclined to believe. In the year 1273 the British Parliament passed an act prohibiting the burning of coal in London, and in 1306 a craftsman was tried, condemned and executed for violating this act.

Today air pollution is undoubtedly one of the most complex problems facing the environmental hygienist. Only recently has he begun to develop the skill and equipment necessary to measure the effects on man or to measure the microquantities of contaminants in the atmosphere. Along with this development, the attitude of the public has changed from one of apathy to a feeling of concern.

Air pollution is a potential problem in all industrialized and urbanized areas. As concentrations of populations become heavier, the industrial, transportation, and waste disposal requirements become more numerous and greater. It is now realized that man must take steps to safeguard this vital resource. There is this concern in many regions of the United States. A result has been the initiation of prevention and control programs ranging in scope from the multimillion dollar activity in Los Angeles County to the part-time, one-man campaigns in a number of small towns. In an attempt to define the nature and magnitude of their problem, communities and states throughout the country are conducting studies. In some instances these studies are very detailed, and in others they are evaluations such as this state-wide appraisal.

FINDINGS

GOVERNMENT

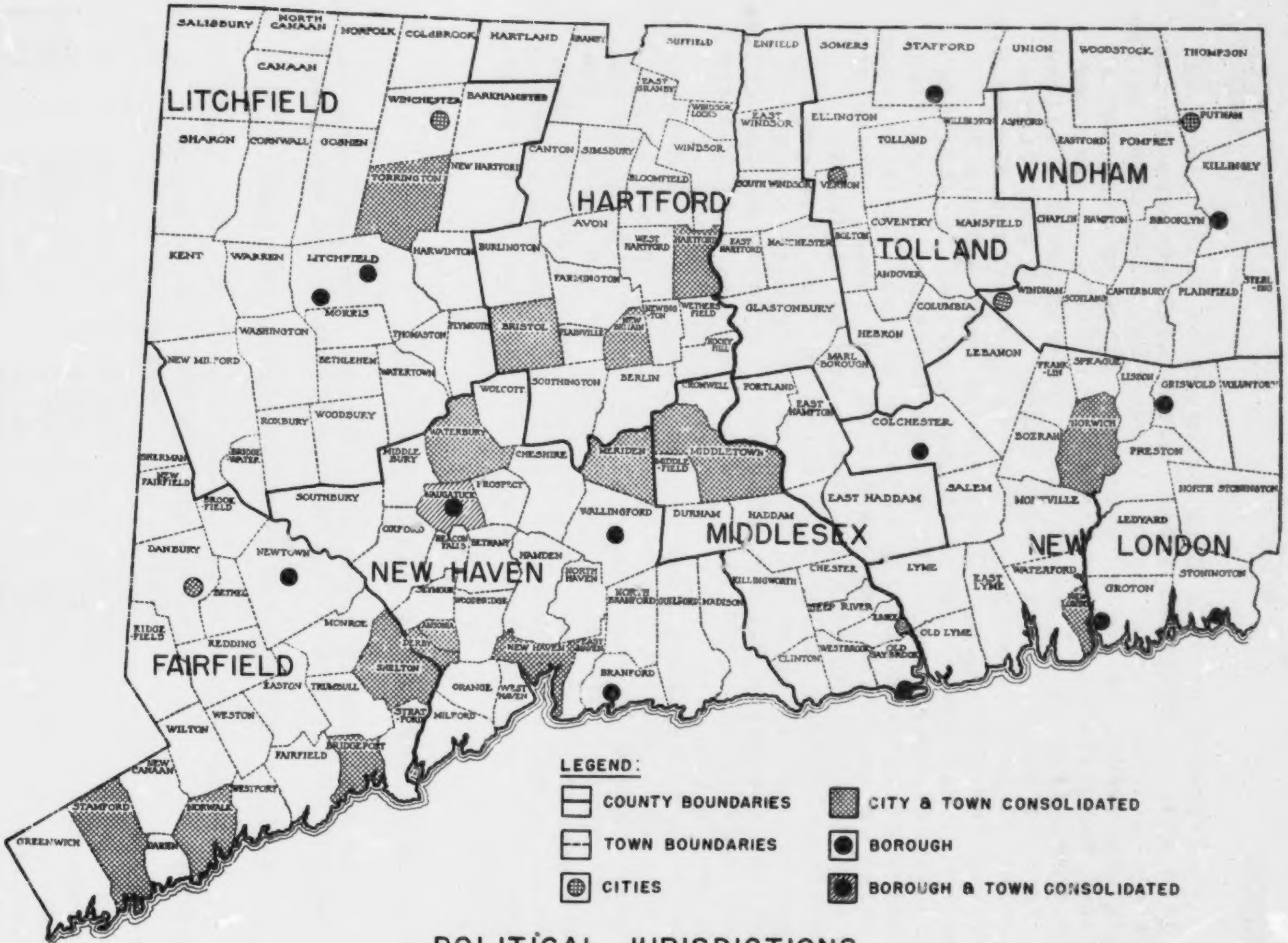
The general pattern of government in Connecticut is that laid down in Colonial times, with local government concentrated in towns rather than in counties. The town, in the New England sense, is not an inhabited place as such but a political subdivision of the State. The State is composed of 169 towns (Fig. 1), some of which contain several villages and others of which contain large cities. The most remote rural area is part of a town. This pattern leaves the county relatively few functions. There are no county seats in Connecticut, and county officials are confined to sheriffs and county commissioners. The county functions are confined to penal institutions and the counties collect their revenue by placing an assessment on the cities and towns. There are eight counties in Connecticut. There are 21 cities in Connecticut. Cities differ from towns in that they are governed by special charters voted by their citizens and approved by the State General Assembly. Sixteen of the cities are coextensive, or consolidated with the town unit and are then properly referred to as the (for example) City of Hartford. The remaining five cities form part of the town in which they are located. In this report, the term "cities and towns" refers to the 169 local self-governing units composing the State. There are 14 boroughs in the State. These boroughs are incorporated areas within towns. One borough, Naugatuck, is consolidated with the town. In this report the boroughs are considered as part of the town in which they are located.

ANALYSIS OF INTERVIEWS AND QUESTIONNAIRES

This analysis is based on findings from 116 towns having 89.3 percent of the State population (Table 1 and Appendix C).

TABLE 1--CITIES AND TOWNS INCLUDED IN STUDY

Coverage	Cities and towns	% of towns	Population (1956 est.)	% of Pop.
Visited	35	20.7	1,673,500	72.9
Questionnaire	81	47.9	378,460	16.4
Covered	116	68.6	2,051,960	89.3
Not covered	53	31.4	244,940	10.7
Totals	169	100.0	2,296,900	100.0


LITCHFIELD
HARTFORD
TOLLAND
WINDHAM
NEW HAVEN
MIDDLESEX
NEW LONDON
FAIRFIELD
SALISBURY
NORTH CANAAN
NORFOLK
COLEBROOK
HARTLAND
SUFFIELD
ENFIELD
SOMERS
STAFFORD
UNION
WOODSTOCK
THOMPSON
CANAAN
WINCHESTER
BARKHAMSTED
EAST GRANBY
WINDSOR LOCKS
EAST WINDSOR
ELLINGTON
PUTNAM
SHARON
CORNWALL
GOSHEN
TORRINGTON
NEW HARTFORD
CANTON
SIMSBURY
WINDSOR
BLOOMFIELD
SOUTH WINDSOR
VERNON
TOLLAND
ASHFORD
EASTFORD
POMFRET
KILLINGLY
AVON
WEST HARTFORD
EAST HARTFORD
MANCHESTER
BOLTON
COVENTRY
MANSFIELD
CHAPLIN
HAMPTON
BROOKLYN
KENT
WARREN
LITCHFIELD
HARWINTON
BURLINGTON
FARMINGTON
ANDOVER
WINDHAM
SCOTLAND
CANTERBURY
PLAINFIELD
MORRIS
WASHINGTON
THOMASTON
PLYMOUTH
BRISTOL
PLAINVILLE
NEWINGTON
NEW BRITAIN
WETHERSFIELD
ROCKY HILL
GLASTONBURY
HEBRON
COLUMBIA
NEW MILFORD
BETHLEHEM
WATERTOWN
WOLCOTT
SOUTHINGTON
BERLIN
CROMWELL
PORTLAND
MARLBOROUGH
LEBANON
FRANKLIN
SPRAGUE
LISBON
GRISWOLD
VOLUNTOWN
ROXBURY
WOODBURY
WATERBURY
EAST HAMPTON
COLCHESTER
BOZRAH
NORWICH
SHERMAN
BRIDGEWATER
NEW FAIRFIELD
MIDDLEBURY
CHESHIRE
MERIDEN
MIDDLEFIELD
MIDDLETOWN
PRESTON
BROOKFIELD
SOUTHBURY
NAUGATUCK
PROSPECT
EAST HADDAM
SALEM
MONTVILLE
NORTH STONINGTON
LEDYARD
DANBURY
NEWTOWN
OXFORD
BEACON FALLS
BETHANY
HAMDEN
WALLINGFORD
DURHAM
HADDAM
SEYMOUR
WOODBRIDGE
NORTH HAVEN
CHESTER
LYME
EAST LYME
WATERFORD
GROTON
STONINGTON
BETHEL
RIDGEFIELD
REDDING
MONROE
ANSONIA
DERBY
NEW HAVEN
EAST HAVEN
NORTH BRANFORD
GUILFORD
MADISON
KILLINGWORTH
DEEP RIVER
ESSEX
OLD LYME
NEW LONDON
SHELTON
BRANFORD
WESTBROOK
OLD SAYBROOK
CLINTON
EASTON
TRUMBULL
ORANGE
WEST HAVEN
STRATFORD
MILFORD
WILTON
WESTON
FAIRFIELD
BRIDGEPORT
NEW CANAAN
WESTPORT
NORWALK
STAMFORD
DARIEN
GREENWICH
LEGEND:
COUNTY BOUNDARIES
TOWN BOUNDARIES
CITIES
CITY & TOWN CONSOLIDATED
BOROUGH
BOROUGH & TOWN CONSOLIDATED

POLITICAL JURISDICTIONS

FIGURE I

Certain more detailed results are based on findings from the 35 cities and towns where personal visits and interviews were made. These 35 towns were chosen because they represent those believed most likely to have air pollution problems because of their size and characteristics.

It should be noted that in no size group, even towns with less than 1000 population, was the coverage less than 50 percent (Table 2).

TABLE 2--POPULATION AND PERCENTAGE OF CITIES AND TOWNS INCLUDED IN SURVEY

Population	Number in State	Number in study	Percent in study
20,000 and over	25	25	100
15,000 to 19,999	11	9	82
10,000 to 14,999	15	8	53
5,000 to 9,999	29	21	72
3,000 to 4,999	25	16	64
1,000 to 2,999	46	27	59
Less than 1,000	18	10	56
Totals	169	116	

Of the 116 cities and towns covered in this survey, it was found that:

1. Air pollutants were reported in noticeable amounts in 53 towns with a total population of 1,736,400 (75.5 percent of the State total).

2. Air pollution was reported as causing discomfort or inconvenience to residents in 45 towns having a total population of 1,605,400 (69.9 percent of the State total).

3. Air pollution was reported as causing property damage in 17 towns having a total population of 658,400 (28.7 percent of the State total). These towns are among those reporting discomfort or inconvenience to residents.

4. Air pollution caused residents to file complaints with authorities in 43 towns having a total population of 1,590,800 (69.2 percent of the State total).

5. Eight towns with a total population of 768,000 (33.5 percent of the State total) have local air pollution ordinances--generally smoke ordinances.

6. No town was found to have any personnel with full-time air pollution control duties. In towns with air pollution control activity, this responsibility is carried out as a part-time duty by one or more persons.

In the 45 towns in which air pollution was reported as causing discomfort or inconvenience, estimates were made to distinguish between those towns wherein the problem was minimal, minor, or greater than minor. In making these estimates, consideration was given to the number of people affected by air pollution problems, the reported degree of effect on comfort or property and whether or not the problems were recurring. Based on information obtained by visits and questions, the 45 towns were classified and grouped as follows:

12 with a total population of 248,900 (10.8 percent of the State total) have minimal problems;

26 with a total population of 1,044,900 (45.5 percent of the State total) have minor problems;

7 with a total population of 311,600 (13.5 percent of the State total) have greater than minor air pollution problems. These are Bridgeport, Danbury, Hamden, Groton, Wallingford, Naugatuck, Rocky Hill, and Ansonia.

In the 35 cities and towns visited, pollution from some sort of industrial establishment was the most frequently reported problem (Table 3). Refuse dumps were reported to be a major local problem in five and were reported to be a problem in a total of 17 cities and towns.

Air pollution sources causing inconvenience to residents or damage to property in eight of these towns were located in adjacent towns (Table 4). About one-fourth of the towns in which the dump is considered a source of air pollution reported the offending dump as one located in another political jurisdiction. Other sources of air pollution causing problems in adjacent towns are utilities, stone, clay and glass works, chemical plants, and drug manufacturers.

Of the 81 smaller towns which responded to the questionnaire, 21 identified one or more specific air pollution problems (Table 5). The problem most frequently identified was the town dump. As would be expected, industrial sources of air pollution are less common in these less populous towns.

TABLE 3--SOURCES OF AIR POLLUTION IN 35 TOWNS VISITED

Source of air pollution	Number of towns with given problem	Percentage of towns	Towns in which problem is			Percent of problem due to				Percent of problem due to		
			Greater than minor	Minor	Not specified or negligible	Smoke	Dust	Odor	Unknown	Heating plant	Incinerator	Unknown
Residential	11	31										
Private homes	9	27			9	60		40			90	10
Apartments	6	17			6	75			25	50	30	20
Commercial	16	46										
Hotels	2	6		1	1	100						
Office buildings	7	20			7	100						
Stores	3	8			3	70			30			
Laundries	9	27		2	7	90		10				
Schools	6	17			6	100				30	30	40
Hospitals	2	6			2	30	70			50		50
Industrial	24	69										
Textile	4	11	1	2	1	80		20		40		60
Lumber	1	3			1	100						
Chemical	8	23	3	3	2	30		70				
Drugs	2	6	1	1				100				
Rubber	5	14	1	1	3	30	10	50	10			
Stone, clay, glass	4	11	2	1	1	40	20	40				
Primary metal	11	31	3	1	7	40	30	10	20			
Fabricated metal	8	23		4	4	60	10	20	10		30	
Mining	1	3		1			100					
Incinerators	3	8		1	2	75		25				
Dumps	17	48	5	3	9	60	8	32				
Utility	4	11	2		2	70	30					
Vehicle exhaust	3	8		1	2							
Miscellaneous	13	37	1	3	9	50	20	25	5			

TABLE 4--AIR POLLUTION FROM AN ADJACENT JURISDICTION IN THE 35 TOWNS VISITED

Source of pollution	Number of towns
Dump	4
Utility	2
Chemical	1
Drug	1
Stone, clay and glass	2
General industry	1

TABLE 5--DISTRIBUTION OF IDENTIFIED AIR POLLUTION PROBLEMS IN 21 SMALLER TOWNS

Pollution source	Number of towns with problem
Dump	9
Natural or agricultural	4
Industrial	7
General smoke	2
Commercial	1
Residential	1
Sewage	1

ANALYSIS OF STATE DEPARTMENT OF HEALTH RECORDS

Records of the State Department of Health were examined to see what air pollution investigations had been carried out in the past. It was found that 541 air pollution investigations have been made since 1923 and that during the past ten years there has been an average of 18 investigations a year. Investigations have been made in 116 of the 169 towns in the State.

Air pollution problems referred to the State Department of Health are handled by the Bureau of Sanitary Engineering. Referrals are generally made by local directors of health. When initiated by someone else, referrals must first be endorsed by a local director of health.

The practice in handling these investigations has been for the Bureau of Sanitary Engineering to investigate and then submit a written report and recommendation to the local director of health. The Bureau of Industrial Hygiene furnishes assistance to the Bureau of Sanitary Engineering on industrial air pollution investigations when requested, and the Bureau of Laboratories furnishes assistance by analyzing samples collected.

Odors have been the most common air pollution problem encountered in these investigations. They account for 79.2 percent of the occurrences; followed by smoke and soot, 13.1 percent; dust, 5.5 percent; fumes, 2.1 percent; and other factors, 1.1 percent. A wide variety of sources have been involved (Table 6).

Air pollution from animal sources has been almost exclusively odor problems associated with chicken manure, garbage fed to hogs, and manure from other animals including horses, goats, and dogs. The industrial sources of air pollution have varied widely with no single industry standing out in this State-wide summary. Dumps which burn and produce smoke and odor have been investigated frequently. The types of commercial sources listed are those that have been investigated more than twice. Those investigated less frequently include fish plants, hotels, canneries, government buildings, commercial vehicles, food stores, and breweries. The natural and liquid waste category covers odor problems arising from discharge of wastes into sewers, creeks and ponds. The large number of miscellaneous sources emphasizes the heterogeneous nature of air pollution sources that have been encountered. A large proportion of the miscellaneous problems noted as being on private property are those of odor caused by poor sanitary practices in the storage and disposal of wastes.

SUMMARY OF LOCAL AIR POLLUTION STUDIES

Air pollution surveys or studies have been made in eight towns in Connecticut, having a combined population of 786,000 (34 percent of the total State population).

1. Hartford: The city health department has been collecting dustfall data since February 1955. Three dustfall collection stations are in operation. These are located so that representative samples are being collected for an industrial, a commercial and a residential area. The samples are analyzed by the State Department of Health.

2. Bridgeport: Early in 1955, the city requested and had enacted by the State Legislature, an enabling act to allow the city to pass an ordinance to control air pollution. Early in 1956, the Mayor of Bridgeport formed a committee to investigate the soot and smoke problem in the city. In August 1956, this committee hired a consulting engineer to aid the group in its study of smoke and soot conditions.

TABLE 6--HEALTH DEPARTMENT AIR POLLUTION INVESTIGATIONS

Source of pollution	Number of investigations	
Animal		
Chicken farms	36	
Hog farms	30	
Other farms	60	
		126
Industrial		
Petroleum and coal	17	
Fur	16	
Fabricated metal	14	
Chemical	12	
Rubber	11	
Primary metal	10	
Rendering	9	
Utility	8	
Stone and brick	8	
Drugs	5	
Textile	4	
Paper	4	
Leather	1	
Lumber	1	
		120
Disposal		
Dump	64	
Junk salvage	5	
Incinerators	5	
		74
Commercial		
Cleaners	19	
Restaurant	10	
Laundry	8	
Market	8	
Bakery	4	
Apartment	3	
		52
Natural and liquid waste		
Sewer	26	
Creek	16	
Pond	7	
		49
Miscellaneous		
Commercial and industrial	66	
Private property	54	
		120
Total		541

3. New Haven: A study of air pollution conditions was made for the city in 1952 by the Industrial Hygiene Foundation. The report of this survey entitled, "The Nature of the Air Pollution Problem in the City of New Haven," by W.C.L. Hemeon, was published in September 1952. In it are discussed the nature and origin of smoke and dust, inventory of stack dust emission, city dustfall, estimate of dustfall origins, general conclusions on nature and origin of city air pollution, and content of an air pollution ordinance. Based on this survey, the city passed an air pollution ordinance in May of 1953 which is considered in a later section of the present report. The city is continuing to collect dustfall samples at five stations in the city.

4. Waterbury: This city has participated in the U.S. Public Health Service National Air Sampling Network. Since 1954, samples have been taken by high-volume samplers at a downtown station and at the city reservoir. These samples have been analyzed at the Robert A. Taft Sanitary Engineering Center in Cincinnati, Ohio.

5. Stratford: Late in 1952, the town of Stratford contracted with an engineering firm to investigate the problem of discoloration of homes in the town. In a report dated July 1953, it was concluded that the discoloration was due to accumulation of air-borne particles, namely sand and mica from natural sources and coke, fly ash, mica and asbestos from industrial sources, on the painted surfaces. Dustfall samples were collected during the survey.

6. Norwich: A preliminary smoke survey was undertaken by the city fire department early in 1956. Readings of Ringelmann Chart for smoke densities were taken over one-hour periods at 15-second intervals for various industrial establishments.

7. Danbury: Prior to enacting legislation (in 1956) on air pollution, the city of Danbury had a survey made of one of its more important problems--odors from fur companies.

8. East Hartford: During May and June of 1947, a smoke survey was made of the town of East Hartford at the request of the town council. To accomplish this survey, sootfall determinations were made by collection in dustfall jars, and readings of smoke density from principal sources were taken with the Ringelmann Chart.

In summary, there is very little information available regarding pollution or emission measurements in Connecticut. Of the previous studies conducted, dustfall records were developed in only four towns, one town has high-volume air sampling records, and only one town has made smoke readings with a Ringelmann Chart. Furthermore, the investigators found very little information available on this subject at the time of their visits to the cities.

POPULATION

The 1950 Connecticut population was 2,007,280 which represented 1.3 percent of the U.S. population.[1] The State ranks 46th in land area and is densely populated with 409.7 persons per square mile. In population density it ranks 4th after Rhode Island, New Jersey, and Massachusetts.

By 1890 over half the population lived in urban areas. This did not occur for the United States as a whole until 1920. The State is now made up largely of city dwellers with 77.6 percent of the population living in urban areas.

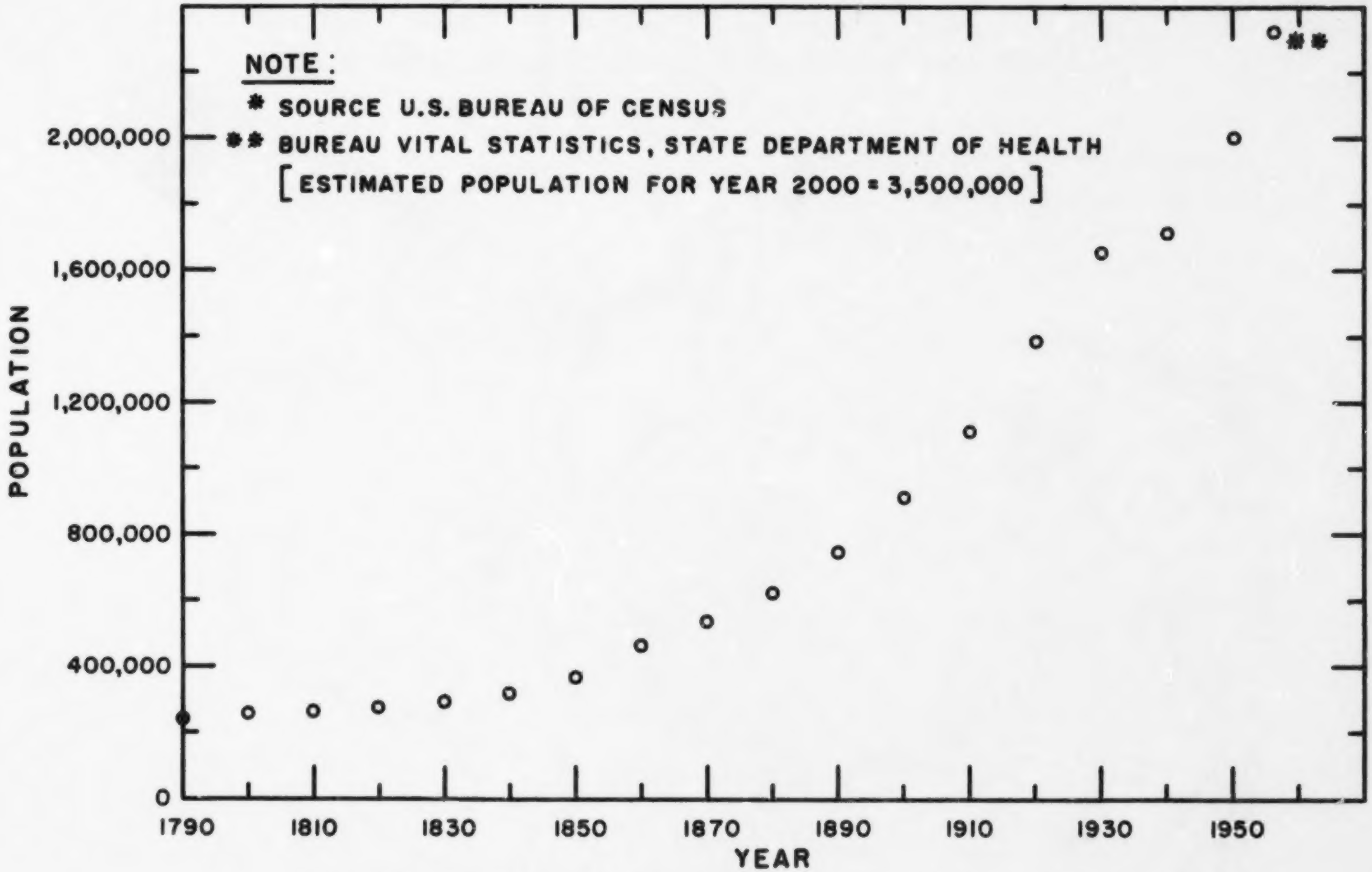
The population estimate of 3,500,000 for the year 2000 (Fig. 2) predicts substantial further growth for the State.[2]

The urbanized population lies in a fairly discrete band starting with the Stamford-Norwalk urbanized areas at the southwestern corner of the State (Fig. 3). This area of heavy population extends up the coast through Bridgeport and New Haven. It then runs north and includes, among others, Waterbury, Meriden, New Britain, Bristol, and the Hartford urbanized areas. However, there are separate cities of considerable size in certain other areas of the State.

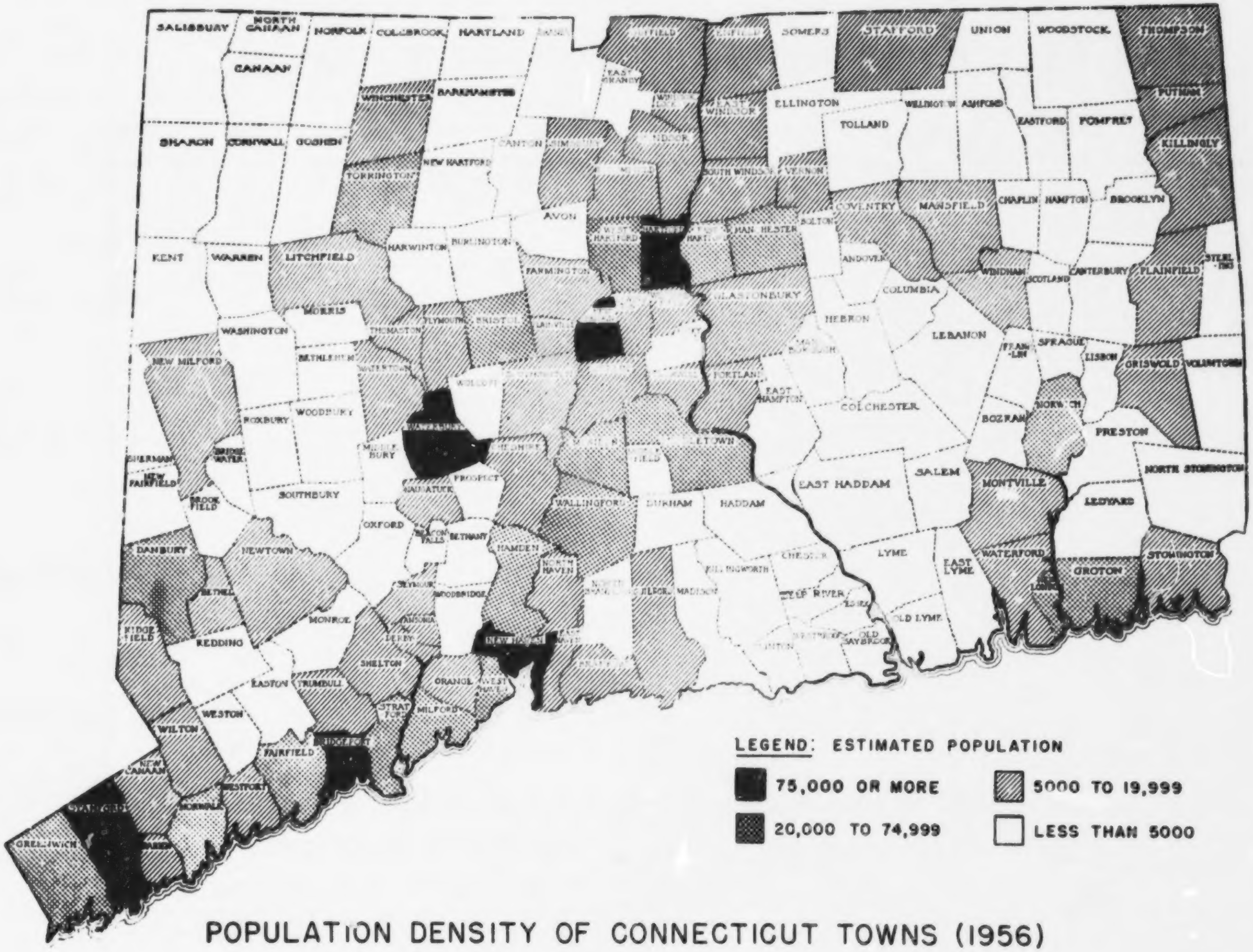
As previously noted, all the land area of the State is incorporated in 169 towns and cities (Table 7).

TABLE 7--POPULATION OF TOWNS AND CITIES (1956 ESTIMATE)[2]

Population range	No. of towns and cities	Population total	Percent of total
100,000 to 200,000	4	632,100	27.3
50,000 to 100,000	4	282,100	12.2
25,000 to 50,000	16	598,000	25.9
10,000 to 25,000	27	391,500	16.9
5,000 to 10,000	29	197,300	8.5
Under 5,000	89	212,000	9.2
Totals	169	2,313,000	100.0



GROWTH IN CONNECTICUT POPULATION, 1790-1950*
FIGURE 2


SALISBURY
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CANAAN
NORFOLK
COLEBROOK
HARTLAND
SOMERS
STAFFORD
UNION
WOODSTOCK
THOMPSON
PUTNAM
KILLINGLY
WINCHESTER
BARKHAMSTED
ELLINGTON
TOLLAND
ASHFORD
EASTFORD
POMFRET
SHARON
CORNWALL
GOSHEN
CANTON
NEW HARTFORD
TORRINGTON
EAST WINDSOR
COVENTRY
MANSFIELD
CHAPLIN
HAMPTON
BROOKLYN
AVON
KENT
WARREN
LITCHFIELD
HARWINTON
BURLINGTON
FARMINGTON
GLASTONBURY
ANDOVER
COLUMBIA
WINDHAM
SCOTLAND
CANTERBURY
PLAINFIELD
MORRIS
PLYMOUTH
BRISTOL
HEBRON
LEBANON
SPRAGUE
LISBON
GRISWOLD
VOLUNTOWN
WASHINGTON
NEW MILFORD
BETHLEHEM
THOMASTON
WATERTOWN
WOLCOTT
PORTLAND
EAST HAMPTON
COLCHESTER
BOZRAH
NORWICH
PRESTON
ROXBURY
WOODBURY
WATERBURY
MIDDLEBURY
BRIDGEWATER
SHERMAN
NEW FAIRFIELD
BROOKFIELD
SOUTHBURY
NAUGATUCK
PROSPECT
EAST HADDAM
SALEM
MONTVILLE
NORTH STONINGTON
LEDYARD
WALLINGFORD
DURHAM
HADDAM
OXFORD
BETHANY
DANBURY
NEWTOWN
HAMDEN
NORTH HAVEN
CHESTER
LYME
EAST LYME
WATERFORD
GROTON
STONINGTON
KILLINGWORTH
MADISON
DEEP RIVER
OLD LYME
BETHEL
WOODBRIDGE
MONROE
REDDING
RIDGEFIELD
SHELTON
NEW HAVEN
OLD SAYBROOK
EASTON
TRUMBULL
ORANGE
MILFORD
WESTON
WILTON
FAIRFIELD
BRIDGEPORT
NEW CANAAN
WESTPORT
STAMFORD
GREENWICH
LEGEND: ESTIMATED POPULATION
■ 75,000 OR MORE
▩ 20,000 TO 74,999
▨ 5000 TO 19,999
☐ LESS THAN 5000

POPULATION DENSITY OF CONNECTICUT TOWNS (1956)

FIGURE 3

In the case of the large cities, such as Hartford, Bridgeport, and New Haven, the city and town are consolidated. In the case of smaller cities or boroughs, the city may constitute only a portion of the town. For example, Danbury city constitutes roughly two-thirds of the population of Danbury town.

TOPOGRAPHY AND CLIMATOLOGY

Connecticut lies mostly in the south portion of the upland region of New England.[3] Its surface is, in general, that of a gently undulating upland divided near the middle by the lowland of the Connecticut Valley (Zone I--Fig. 4).[4] Between the upland and the sea lies a strip of relatively low land known as the seaboard lowland (Zone II). Although Connecticut borders on the ocean, it has a continental type of climate since the winds are primarily from the southwest, northwest, and north.[5]

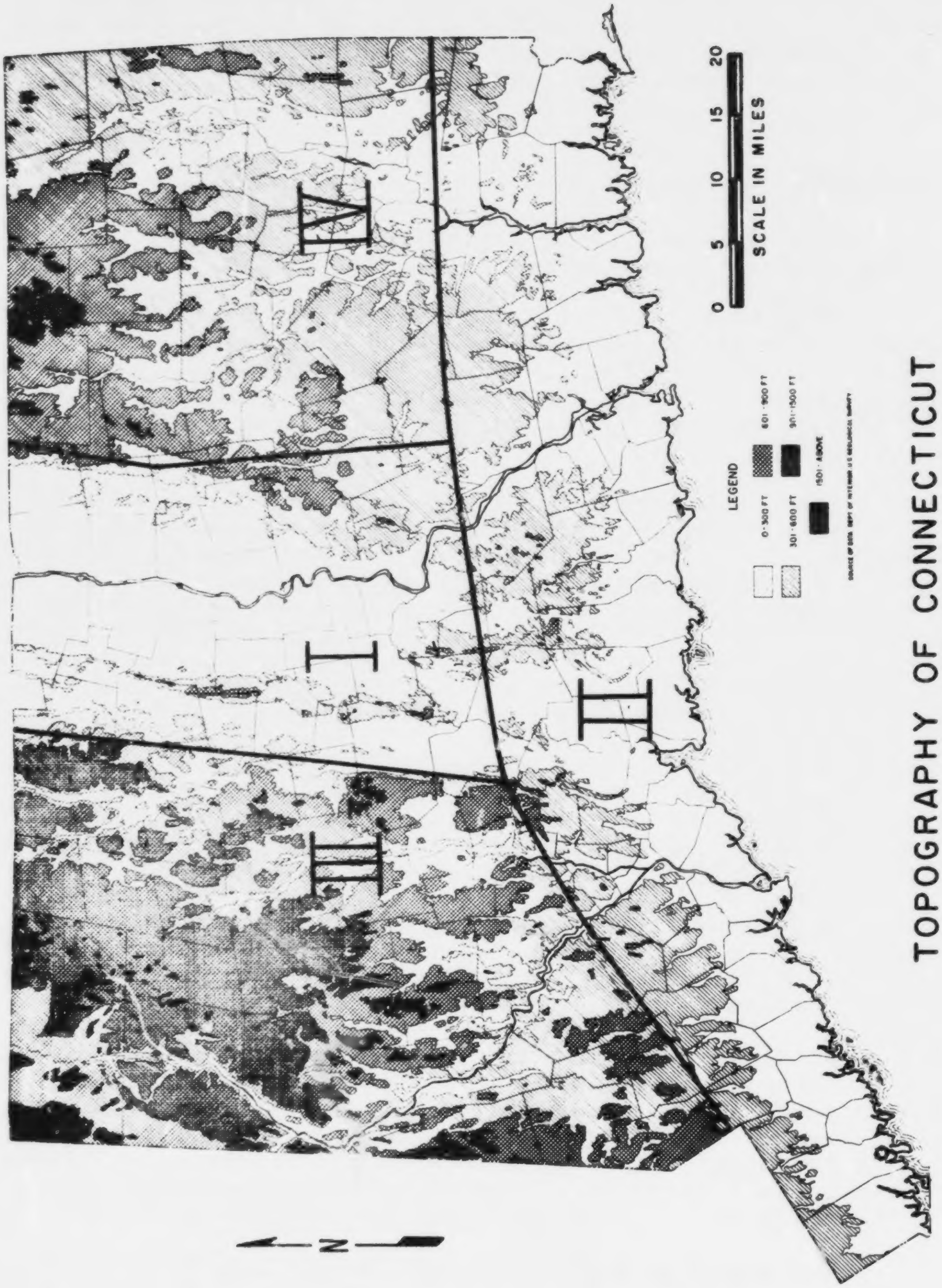
There is a close relation between the average annual isotherms and the contour lines of the topographic map. Along the coast the average annual temperature is about 50°F, and it is nearly that high in the central lowlands. The 49° isotherm follows closely the eastern and western boundary lines of the central lowlands. In the highlands of the east the average temperature is about 47°, and in the highlands of the west it is about 46°. The geographical distribution of average annual temperature is shown in Figure 5.

The average annual precipitation for the State as a whole is about 44.6 inches. The average precipitation does not vary much from month to month, being between 3.5 inches and 4.25 inches per month the entire year. The geographical distribution of precipitation is shown in Figure 6.

The snowfall increases sharply from the coast to the northwest part of the State. Near the coast the annual average snowfall is less than 35 inches, whereas in parts of the northwestern highlands it is over 75 inches.

At stations in and near Connecticut the average annual relative humidity at 8 a.m. varies from 70 to 78 percent. At noon, the variation is from 57 to 65 percent; and at 8 p.m., it is from 67 to 71 percent. The relative humidity is generally lowest in the early afternoon and highest just before sunrise. As a rule, it is lowest in the spring and highest in the early fall.

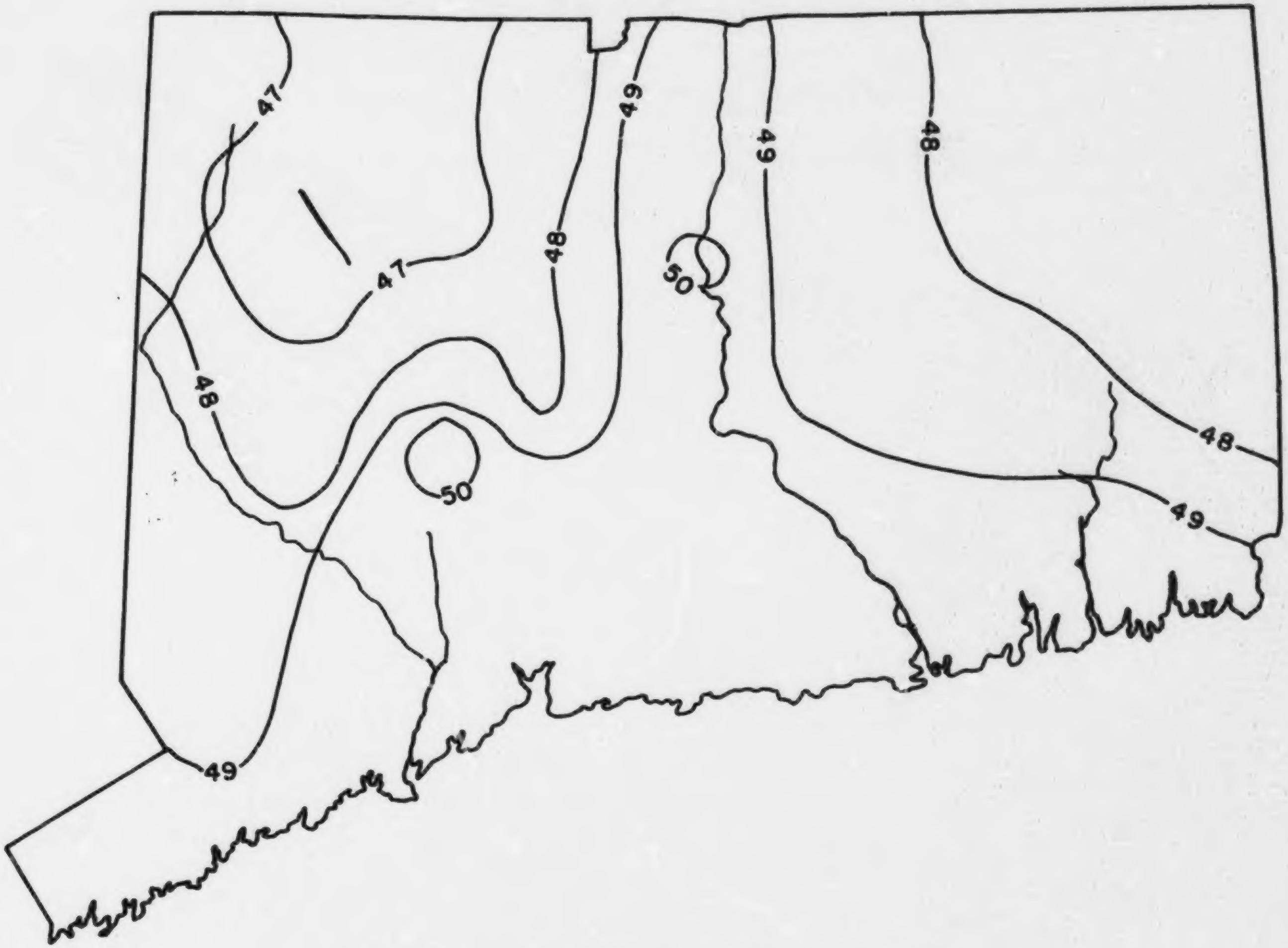
The possible amount of sunshine (or length of day) in Connecticut ranges from 9 hours in December to 15 hours in June. Along the coast the average annual amount of sunshine is 60 percent of the possible total amount, but in the northwestern part of the State it is approximately 52 percent.


IV
I
III
II
N
LEGEND
0-300 FT
301-600 FT
601-900 FT
901-1500 FT
1501-ABOVE
0
5
10
15
20
SCALE IN MILES

SOURCE OF DATA DEPT OF INTERIOR U.S. GEOLOGICAL SURVEY

TOPOGRAPHY OF CONNECTICUT

FIGURE 4


47
47
48
48
48
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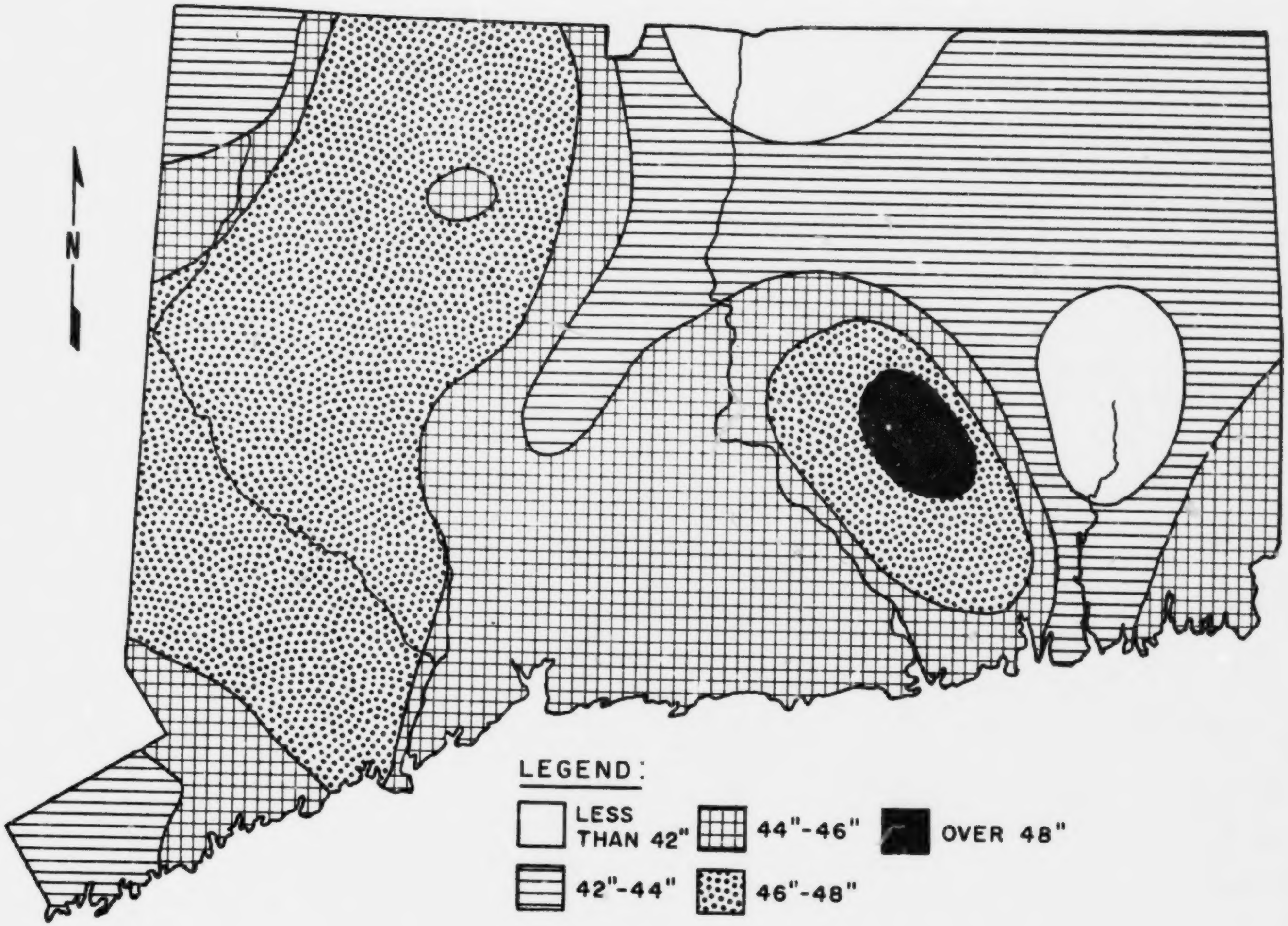
49
49
50
50

AVERAGE ANNUAL TEMPERATURE
FIGURE 5


N
LEGEND:
LESS THAN 42"
44"-46"
OVER 48"
42"-44"
46"-48"

AVERAGE ANNUAL PRECIPTATION
FIGURE 6

Northwest winds prevail over most of the State from November through April and over the highlands during most of the year. From May through October southwest winds prevail along the coast and over the central lowlands. Light winds generally prevail over the State during the warm months and frequently during the winter season. Monthly data on wind speed, wind direction, and frequency of calms are given in Appendix D. These data are shown for three weather stations in Connecticut as well as three nearby stations outside the State.[6] The data represent monthly averages based on six to ten years of records, depending on the availability of data.

Although local areas may be affected by lack of moisture for short periods nearly every summer, Connecticut seldom experiences prolonged general droughts.

Light fog occurs about 185 days a year at Hartford (in the central lowlands) and some 215 days a year at New Haven (on Long Island Sound). Heavy fog (when visibility is less than 1/4 mile) occurs 40-50 days per year at Hartford, and 30-35 days per year at New Haven. Days of heavy fog are more common in the fall of the year, being about three to four times more common then than in the spring.

The number of clear days per year is about 85 at Hartford and about 100 at New Haven; the approximate number of partly cloudy days per year is 100 at Hartford and New Haven; the approximate number of cloudy days per year is 180 at Hartford and 165 at New Haven.

Zone I (Central Valley)

The central valley is about 20 miles wide in the north and narrows to a 5-10 mile width in the south. The land is low and generally level or gently rolling but there are ridges of traprock which rise several hundred feet above the valley floor. The range of hills forming the eastern and western boundaries of this valley are about 400-600 feet above the valley floor. The normal prevailing winds are along the valley from the north and northwest during the winter and and from the south during the summer. Calms are frequent and occur from a minimum of 16 percent of the time during the spring to a maximum of 40 percent of the time during the fall.

The principal source of weather data for the Connecticut Valley is the U.S. Weather Bureau Station at Bradley Field 10 miles north of Hartford. A new weather station at Middletown was activated in April 1956. Data on wind speed, wind direction, and temperatures at elevations above ground are available from this station. From the brief records already collected there, it is apparent that stable air conditions due to nocturnal temperature inversions are common during the summer.

Zone II (Seaboard)

The land is low, even marshy in places, and fairly level. The seaboard lowland is from 10 to 15 miles wide, being wider in the east; behind it rise the hills of the New England highlands. The dominant climatological feature of this seaboard lowland is that due to its location along Long Island Sound. The differential heating and cooling of the adjacent land and sea areas result in the land-sea breeze Regime. A forty-year weather record at New Haven illustrates this condition. From April through August the wind is from the north (land breeze) during the early morning hours (2 a.m. to 9 a.m.). During midmorning the wind changes direction and is from the south (sea breeze) until past midnight. This land-sea breeze effect normally disappears about 12 miles inland. The prevailing summer wind is from the south and southwest; the prevailing winter wind is from the northwest. Calms are relatively infrequent, occurring about five to 15 percent of the time, with the greater occurrence during the summer months. Temperature inversion conditions are quite frequent. They generally develop between 3 a.m. and 5 a.m. and dissipate between 8 a.m. and 10 a.m. The principal sources of weather data for the seaboard lowlands are the U.S. Weather Bureau stations at Bridgeport, New Haven, and Providence, Rhode Island.

Zone III (Western Hills)

In the western section of the State the land is hilly to mountainous. These hills form the southern extension of the Berkshire Hills of Massachusetts. Heights range from 1000 to 2000 feet in the north and slope down to the seaboard in the south. The prevailing winds are northwest during the winter and southwest during the summer. No information was available on the occurrence of calms or inversions. The Naugatuck and the Housatonic River valleys in this section of the State are both narrow and deep. These valleys are generally well under a mile in width and the height of the surrounding hills varies between 300 and 800 feet. Undoubtedly the wind pattern and air circulation in these two valleys are materially affected by the local topography. However, there were no data available regarding these effects. The Naugatuck River valley is heavily industrialized; in it are located the cities of Torrington, Thomaston, Waterbury, Naugatuck, and Ansonia, with a total manufacturing labor force of 54,000. This is an area that bears surveillance since it may combine the topographical, meteorological, and pollution source features that produce air pollution problems.

Zone IV (Eastern Hills)

In the eastern section of the State are the rolling hills of the highland that extend down from Massachusetts. Heights vary from 1000 feet in the north to 200 feet or less in the south. Winds prevail from the northwest during the winter months and from the southwest during the summer. No data are available concerning occurrence of calms and inversions.

INDUSTRY

Connecticut has been an industrial State since about 1850. Lacking natural resources such as iron and coal, and with agriculture able to support only a relatively small proportion of the State population, Connecticut even in Colonial days turned to manufacturing as a provider of income (Table 8).

TABLE 8--EMPLOYMENT BY MAJOR GROUPS (1950)[7]

Major groups	Percent of employees		Ratio
	Conn.	U.S.	Conn./U.S.
Agriculture, forestry and fish plants	3.0	12.5	0.24
Mining	0.1	1.7	0.06
Construction	5.9	6.1	0.97
Manufacturing	42.6	25.9	1.65
Transportation, communications, utilities	5.3	7.8	0.68
Wholesale and retail trade	16.8	18.8	0.89
Finance, insurance and real estate	4.6	3.4	1.35
Business and personal services	7.5	8.7	0.87
Professional services	8.9	8.3	1.07
Public administration	3.4	4.4	0.77
Entertainment and recreational services	0.7	1.0	0.70
All others	1.2	1.4	0.86

Manufacturing industry is dominant in the State's employment pattern. Agriculture and mining are significantly lower in proportion than the United States average.

Agriculture

Prior to the early 1800's, over 90 percent of the population depended upon agriculture. Through the years, agriculture in Connecticut has been highly responsive to changes in the general economy of the region. With the expansion of manufacturing industries, a specialized commercial agriculture based on the production of fluid milk, other perishable foodstuffs, and tobacco has evolved. Despite the fact that the number of persons working in agriculture and the total land in farms have been decreasing, the value of agricultural products has been mounting. In 1948 the cash receipts from farm marketing amounted to $174,524,000.

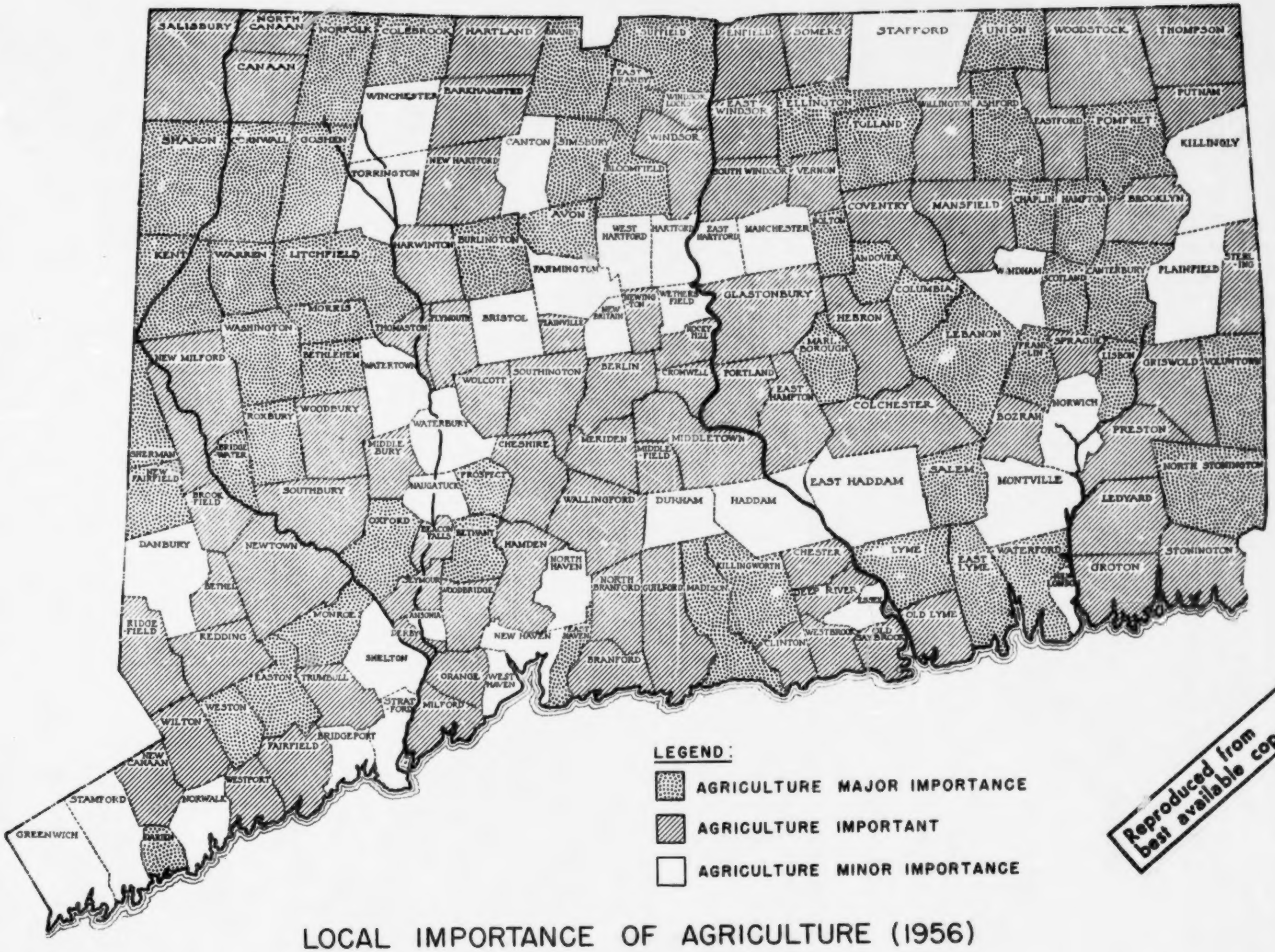
Principal agricultural commodities are: poultry products, dairy products, cigar wrapper and binder tobacco, fruits and vegetables. Farm workers may be found in every town in Connecticut, and there is a fairly even distribution of agricultural people throughout the State. The heaviest concentration occurs in the north central section of the State where tobacco and potatoes are grown in the rich Connecticut River Valley. Dairy farms are to be found throughout Connecticut with higher numbers reported for Litchfield County (in the northwestern part of the State). Poultry farms are likewise scattered throughout the State, although several eastern Connecticut towns can claim an especially large number. Other livestock, fruit, vegetable, and general farms are well distributed.[8]

Of the 169 towns in Connecticut, agriculture is considered the only principal industry in 54 towns (Fig. 7); it is considered a principal industry in an additional 79 towns. Only in 36 towns is agriculture not considered an important industry.[9]

The relationships between agriculture and air pollution may be considered first in terms of possible damage to crops and animals, and secondly in terms of air pollution arising from agriculture or natural processes that may cause nuisance to man.

No cases were reported in this study in which air pollution caused damage to agriculture. A possible exception is the shade-grown tobacco in the Hartford-Windsor Locks area which has in recent years developed a small white spot called "flec." This flecking ruins the leaves on which it appears. The cause of this flecking has not been determined, and air pollution has been considered as one of a number of possible causes.

During the flood of August 1955, considerable top soil and vegetation were removed from some of the valley land by the flooding rivers. On drying, this barren land in some instances became a source of wind-blown dust, but this condition was relatively short lasting. Vegetation quickly took hold where there was any loose soil. Another factor which may cause dustiness is tillage of land. After the land is tilled and the surface has dried, there may be some dust blowing before the crop comes up. Conditions under which dust may occur from this source are limited and have not been reported to cause any substantial problem. Problems may


SALISBURY
NORTH CANAAN
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COLEBROOK
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SUFFIELD
ENFIELD
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STAFFORD
UNION
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CANAAN
WINCHESTER
BARKHAMSTED
EAST WINDSOR
ELLINGTON
WILLINGTON
ASHFORD
PUTNAM
SHARON
CORNWALL
GOSHEN
CANTON
SIMSBURY
WINDSOR
TOLLAND
EASTFORD
POMFRET
KILLINGLY
TORRINGTON
NEW HARTFORD
BLOOMFIELD
SOUTH WINDSOR
VERNON
COVENTRY
MANSFIELD
CHAPLIN
HAMPTON
BROOKLYN
AVON
WEST HARTFORD
HARTFORD
EAST HARTFORD
MANCHESTER
BOLTON
KENT
WARREN
LITCHFIELD
HARWINTON
BURLINGTON
FARMINGTON
ANDOVER
WINDHAM
SCOTLAND
CANTERBURY
PLAINFIELD
STERLING
NEWINGTON
WETHERSFIELD
GLASTONBURY
COLUMBIA
MORRIS
THOMASTON
PLYMOUTH
BRISTOL
PLAINVILLE
NEW BRITAIN
ROCKY HILL
HEBRON
LEBANON
FRANKLIN
SPRAGUE
LISBON
GRISWOLD
VOLUNTOWN
WASHINGTON
BETHLEHEM
MARLBOROUGH
NEW MILFORD
WATERTOWN
WOLCOTT
SOUTHINGTON
BERLIN
CROMWELL
PORTLAND
EAST HAMPTON
COLCHESTER
NORWICH
ROXBURY
WOODBURY
BOZRAH
PRESTON
WATERBURY
MIDDLEBURY
CHESHIRE
MERIDEN
MIDDLETOWN
MIDDLEFIELD
SHERMAN
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NAUGATUCK
PROSPECT
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LEDYARD
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BEACON FALLS
BETHANY
DANBURY
NEWTOWN
HAMDEN
NORTH HAVEN
CHESTER
LYME
EAST LYME
WATERFORD
STONINGTON
SEYMOUR
NORTH BRANFORD
GUILFORD
MADISON
KILLINGWORTH
DEEP RIVER
ESSEX
NEW LONDON
GROTON
BETHEL
WOODBRIDGE
ANSONIA
RIDGEFIELD
REDDING
MONROE
DERBY
NEW HAVEN
EAST HAVEN
WESTBROOK
OLD SAYBROOK
OLD LYME
CLINTON
SHELTON
BRANFORD
EASTON
TRUMBULL
ORANGE
WEST HAVEN
WESTON
STRATFORD
MILFORD
WILTON
FAIRFIELD
BRIDGEPORT
NEW CANAAN
WESTPORT
STAMFORD
NORWALK
DARIEN
GREENWICH
LEGEND:
AGRICULTURE MAJOR IMPORTANCE
AGRICULTURE IMPORTANT
AGRICULTURE MINOR IMPORTANCE

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LOCAL IMPORTANCE OF AGRICULTURE (1956)

FIGURE 7

arise due to the application of fertilizers and insecticides.

The State Department of Health records show that each year about four investigations are made involving odor nuisances from farm operations. These odor problems have been principally due to chicken waste, garbage fed to hogs, and the storage and spreading of organic fertilizer.

Nonmanufacturing

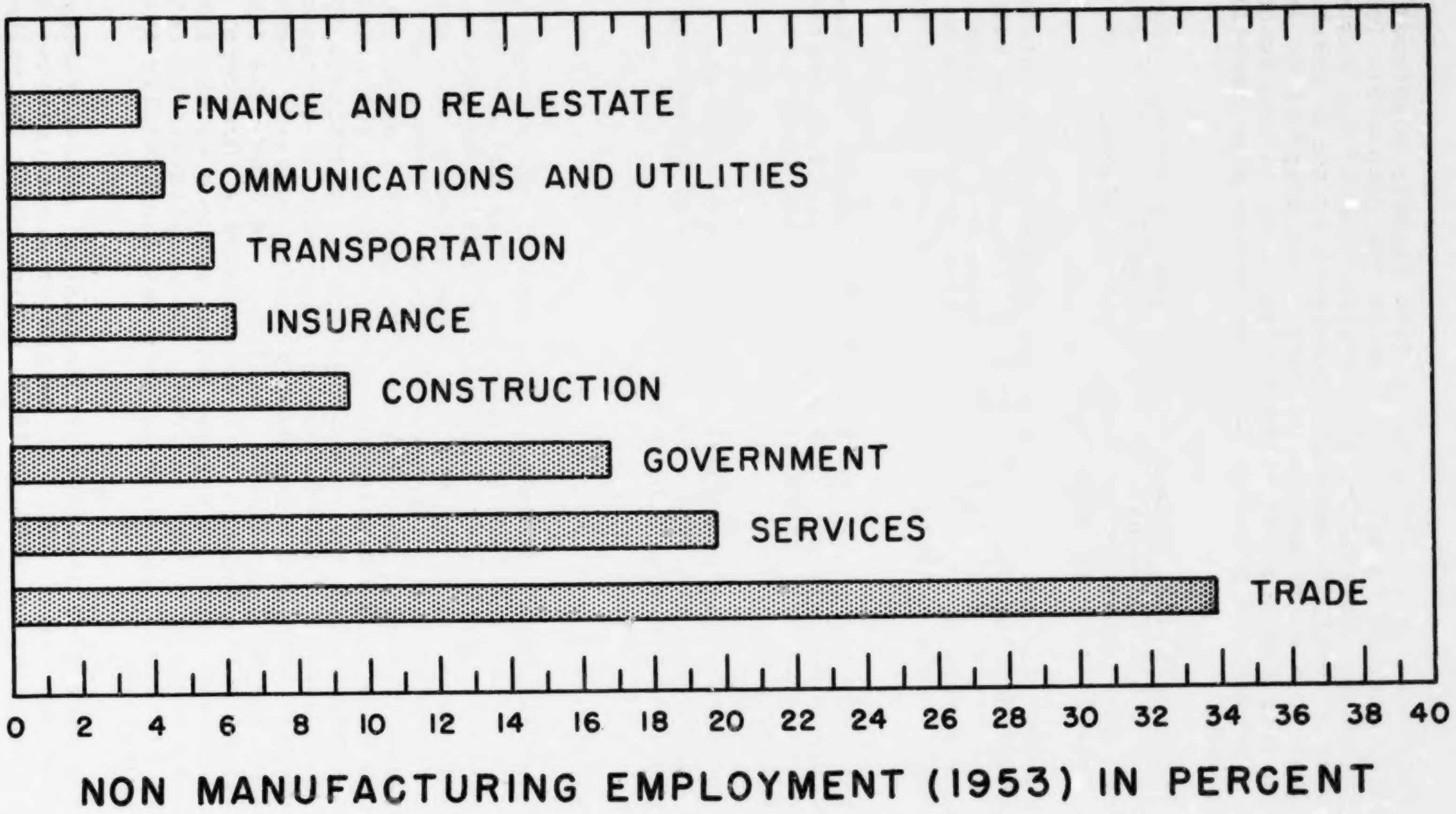
The 421,500 nonmanufacturing, nonfarming employees are engaged in many and varied activities (Fig. 8)[10,11], some of which cause air pollution. Smoke arising from the heating plants of commercial buildings whether they be hotels, laundries, schools or the post office is a common source of pollution.

Mining: The mineral industries of Connecticut have had a declining fortune. The early settlers discovered metals and began to mine them. However, the production of metals today is not economically worthwhile. In 1952 there was no mine production in the State. Quarries of granite near Long Island Sound, of sanstone at Portland, and of feldspar at Branchville and South Glastonbury furnish building materials. However, for many years, the greatest source of income from minerals has been ledges of traprock. Mining is considered a principal industry in three towns and is carried on to some extent in 28 additional towns.[9] Crushed stone quarries have been noted as a major source of dust.

The mineral output of Connecticut in 1952 was a little over 5.5 million tons, valued at $7,124,697. Stone quarrying (crushed stone) is the principal mineral industry (Table 9).

TABLE 9--MINERAL OUTPUT FOR CONNECTICUT (1952)[12]

Mineral	Tons	Value in dollars	Production area (County)
Clays	157,500	157,500	Hartford
Feldspar	12,022	87,432	Middlesex
Mica	11	7,073	Fairfield, Middlesex
Sand and gravel	2,581,247	1,933,214	Hartford, New Haven, Fairfield, and Litchfield
Stone	2,837,045	4,101,060	- - -
Lime, quartz, peat	- - -	838,418	- - -
Totals	5,587,825	7,124,697	


FINANCE AND REALESTATE
COMMUNICATIONS AND UTILITIES
TRANSPORTATION
INSURANCE
CONSTRUCTION
GOVERNMENT
SERVICES
TRADE
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30
32
34
36
38
40
NON MANUFACTURING EMPLOYMENT (1953) IN PERCENT

FIGURE 8

Construction: Dust arising from highway construction and similar sources is a frequent cause for complaints from local residents. Currently, the construction of the Connecticut thruway through the metropolitan areas of southwestern Connecticut is a major source of dust. The disposal of the dredgings from Connecticut harbors along Long Island Sound creates a problem of odor and dust and causes many complaints from residents.

Transportation, Communications and Utilities: Transportation and utilities have in common, as a source of air pollution, the combustion of fuel. This is discussed in greater detail later in this report.

Trade: Air pollution from the wholesale and retail trade industries includes hydrocarbons from petroleum bulk storage and retail filling stations, smoke and odor from automobile scrapping establishments (where junked auto bodies are burned), odors arising from restaurants and markets and others.

Finance, Insurance and Real Estate: Aside from occasional smoke and fly ash from an office building, heating plant or water heater, these activities do not contribute to air pollution.

Services: The commonest air pollutants from the service industries are smoke and odor from laundries, dry cleaning establishments, and hotels.

Manufacturing

Manufacturing has encountered none of the vicissitudes experienced by agriculture and mining. It is notable for its early beginning and its development, in certain branches, beyond that found in other States. Iron products were manufactured throughout the eighteenth century. Tinware was manufactured in Berlin as early as 1740 and tin, steel and iron goods were peddled from Connecticut through the colonies. By 1730, London hatters were complaining of competition from Connecticut hats. From 1802, brass works were in operation at Waterbury; the great brass manufacturing business there grew out of the making of metal buttons. In 1788, the first woolen mills in New England were established at Hartford; in 1806, a mill was built at Seymour which was one of the first New England factory towns; in 1804, the manufacture of cotton was begun at Vernon; and silk culture was successfully introduced about 1732.

The period of greatest development of manufacturing began after the War of 1812. A decade of great relative development was that of 1909 to 1919, during which the value of products increased 184 percent. During the period 1850 to 1900, when the population increased 145 percent, the number of wage earners employed in manufacturing establishments increased 248 percent. World War I brought a great volume of orders to Connecticut factories. The depression of the 1930's was felt very severely in the State. At its height, in 1933, there were only 183,300 manufacturing employees as compared with 332,800 in 1919. World War II also brought a great volume of orders to Connecticut factories and by 1947 the number of manufacturing employees had increased to 399,600.

The manufacturing industries have shown substantial growth in recent years (Tables 10, 11, and 12).

TABLE 10--GENERAL MANUFACTURING STATISTICS FOR CONNECTICUT[13]

Item	1947	1954	Percent change 1947-54
No. of establishments			
1-19 employees	2,308	3,255	+41
20-99 "	1,029	1,212	+18
100 or more "	609	649	+ 7
Totals	3,946	5,116	+30
No. of employees	399,955	413,833	+ 4
Payroll	$1,149,000,000	$1,717,000,000	+49
Value added by mfr.	$1,896,000,000	$2,868,000,000	+51
Capital expenditures, new	$ 116,000,000	$ 131,000,000	+13

TABLE 11--MANUFACTURING EMPLOYMENT BY COUNTY[13]

County	1954 employment	Change in employment 1947-1954
Hartford	132,900	+19,000
New London	22,600	+ 4,700
Windham	12,300	+ 300
New Haven	110,600	0
Middlesex	10,100	- 400
Tolland	3,000	- 1,300
Litchfield	16,900	- 1,400
Fairfield	105,400	- 7,200

TABLE 12--GENERAL STATISTICS FOR THE STATE OF CONNECTICUT BY MAJOR INDUSTRY GROUP, 1954

Major industry group	Total number of estab-lish-ments	Number of establishments with			All employees		Value added by manu-facture (1,000)	Capital expendi-tures, new (1,000)	Change in employment 1947-1954 (percent)
		1-19 em-ployees	20-19 em-ployees	100 or more em-ployees	Number	Payroll ($1,000)			
All industries, total	5,116	3,255	1,212	649	413,833	1,717,269	2,868,312	131,651	+ 3.5
Machinery, except electrical	858	608	161	89	72,088	323,277	551,930	25,298	- 7.2
Transportation equipment	145	85	28	32	65,732	306,635	450,174	16,615	+ 123.0
Fabricated metal products	765	513	173	79	42,683	174,344	276,886	11,542	- 24.1
Miscellaneous manufactures	350	202	81	67	41,794	162,210	268,410	11,292	+ 11.9
Electrical machinery	210	87	66	57	31,713	125,369	223,464	7,200	- 5.4
Primary metal industries	196	91	53	52	27,780	124,596	219,094	16,269	- 20.7
Textile mill products	221	71	83	67	26,538	92,776	138,059	4,522	- 31.8
Instruments and related products	105	50	22	33	17,832	70,357	123,896	5,322	- 4.3
Apparel and related products	384	174	173	37	17,430	46,795	75,895	810	+ 7.9
Printing and publishing	459	348	82	29	13,711	60,219	92,164	4,252	+ 23.8
Rubber products	57	24	17	16	13,052	53,443	94,409	7,452	+ 23.6
Food and kindred products	559	427	109	23	12,434	49,065	93,003	4,769	+ 51.5
Chemicals and products	162	116	27	19	9,946	44,612	126,931	8,247	+ 29.0
Pulp, paper, and products	109	49	37	23	8,260	35,925	59,462	4,195	+ 9.7
Stone, clay, and glass products	132	89	34	9	4,901	20,543	32,629	1,912	- 15.5
Furniture and fixtures	157	121	31	5	3,217	11,657	17,647	939	+ 33.8
Leather and leather products	44	21	16	7	2,310	6,801	8,975	287	+ 47.0
Lumber and wood products	169	152	14	3	1,598	5,256	8,596	359	+ 12.0

Industries showing substantial growth are transportation equipment (airplane engines and parts), food and kindred products, leather and leather products, furniture and fixtures, printing and publishing, and rubber products, whereas those showing marked decline are textile mill products, fabricated metal products, primary metal industries, and stone, clay and glass products. The areas of greatest industrial growth are Hartford (East Hartford) and New London (Groton) (Table 11).

Manufacturing operations in Connecticut employ 458,100 persons (1953) and center in the metal-working industries which account for 71.6 percent of the manufacturing employees, but extend to a wide variety of different types of manufacturing (Fig. 9).[10,11] In fact, there is some representation in Connecticut of nearly 75 percent of all the industry types found in the United States. In general, Connecticut manufacturing is of the type that involves a high degree of precision and adds relatively large value to the raw materials in the process of manufacturing.

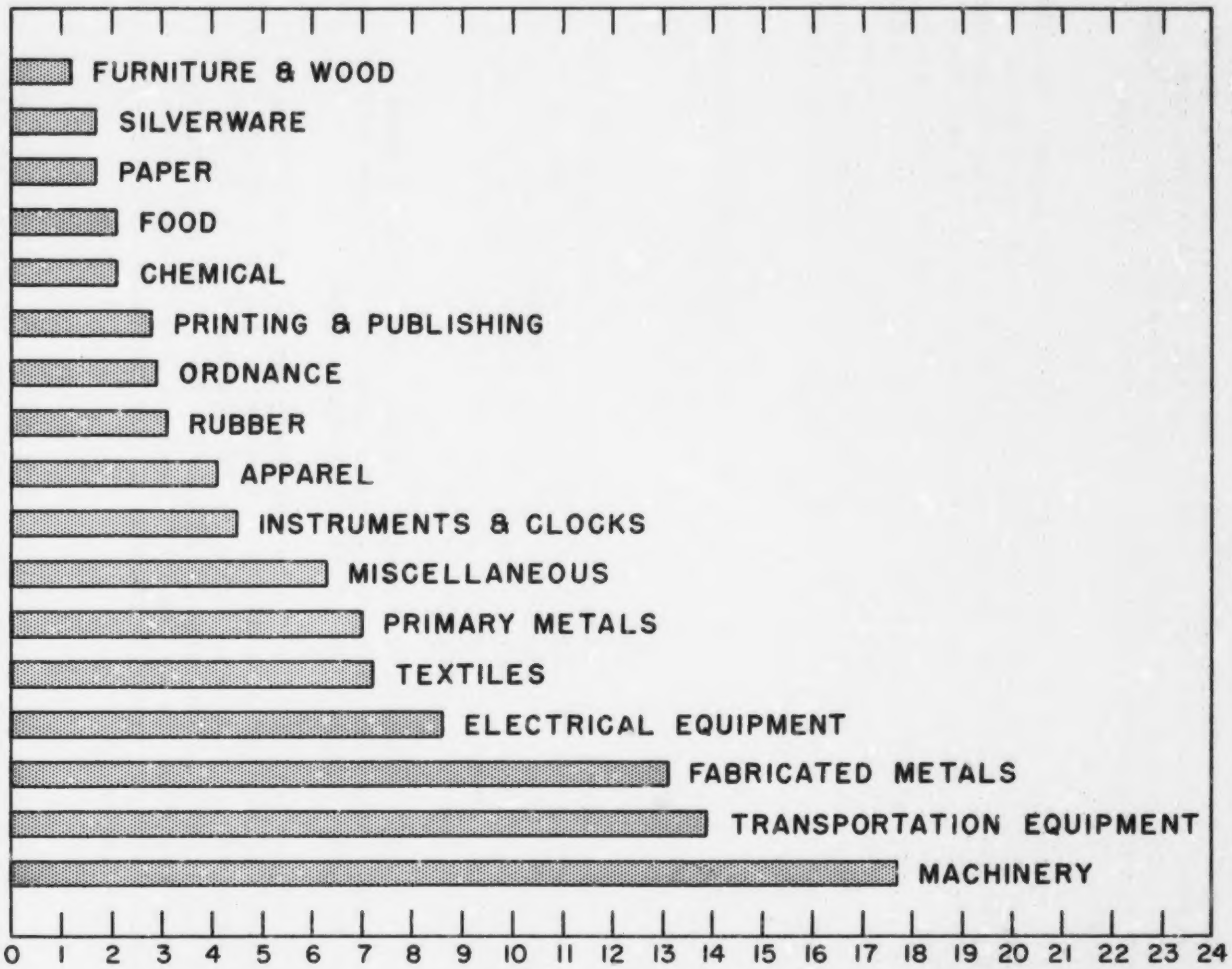
The manufacturing industries are widely distributed throughout the State (Fig. 10[14] and Appendix E[15]). Manufacturing is considered a principal industry in 115 of the 169 towns in Connecticut.[9]

The Standard Industrial Classification Manual[16] divides manufacturing industries into 21 major groups. The contribution of the more significant of these groups to air pollution will be considered here. The problem associated with these industries, as shown by the number of investigations made by the State, can be noted in Table 6.

Food: Slaughter houses, canneries, smoke houses, breweries, and the like are common sources of odors and give rise to many complaints of the nuisance type.

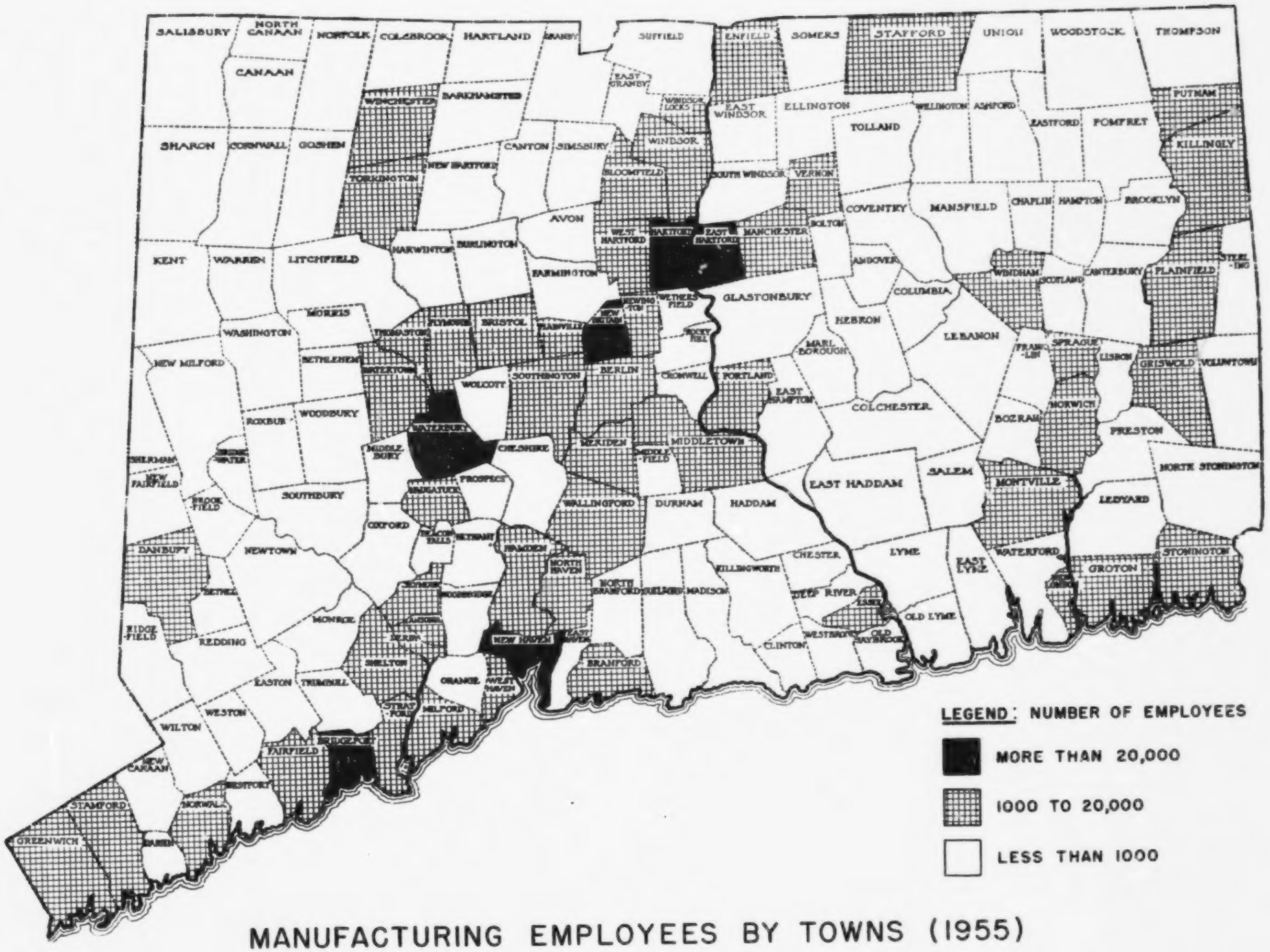
Textile: The textile industry is located in the eastern section of the State. However, the hat manufacturers are located in and near Danbury in the west. Included in this group are producers of hatters' fur, the processing of which gives rise to malodors. Antiquated plants, characteristic of the textile industry, may produce smoke from their heating plants.

Chemical: The chemical industry is located in southwestern Connecticut along the coast from Stamford to New Haven, and in the lower Naugatuck Valley; some chemical industry is to be found in Hartford, Middletown, and New London. The primary air pollutants associated with the chemical industries are gases, mists and odors emitted to the atmosphere.



MANUFACTURING EMPLOYMENT (1953) IN PERCENT

FIGURE 9


SALISBURY
NORTH CANAAN
NORFOLK
COLEBROOK
HARTLAND
GRANBY
SUFFIELD
ENFIELD
SOMERS
STAFFORD
UNION
WOODSTOCK
THOMPSON
CANAAN
EAST GRANBY
WINDSOR LOCKS
EAST WINDSOR
ELLINGTON
WINCHESTER
BARKHAMSTED
WILLINGTON
ASHFORD
EASTFORD
POMFRET
PUTNAM
SHARON
CORNWALL
GOSHEN
CANTON
SIMSBURY
WINDSOR
TOLLAND
KILLINGLY
NEW HARTFORD
TORRINGTON
BLOOMFIELD
SOUTH WINDSOR
VERNON
COVENTRY
MANSFIELD
CHAPLIN
HAMPTON
BROOKLYN
AVON
WEST HARTFORD
HARTFORD
EAST HARTFORD
MANCHESTER
BOLTON
KENT
WARREN
LITCHFIELD
HARWINTON
BURLINGTON
FARMINGTON
ANDOVER
WINDHAM
SCOTLAND
CANTERBURY
PLAINFIELD
STERLING
WETHERSFIELD
GLASTONBURY
COLUMBIA
NEWINGTON
NEW BRITAIN
MORRIS
PLYMOUTH
BRISTOL
PLAINVILLE
HEBRON
LEBANON
WASHINGTON
THOMASTON
ROCKY HILL
MARLBOROUGH
FRANKLIN
SPRAGUE
LISBON
GRISWOLD
VOLUNTOWN
NEW MILFORD
BETHLEHEM
WATERTOWN
SOUTHINGTON
BERLIN
CROMWELL
PORTLAND
EAST HAMPTON
WOLCOTT
COLCHESTER
NORWICH
ROXBUR
WOODBURY
BOZRAH
WATERBURY
PRESTON
SHERMAN
BRIDGEWATER
MIDDLEBURY
CHESHIRE
MERIDEN
MIDDLEFIELD
MIDDLETOWN
NEW FAIRFIELD
BROOKFIELD
SOUTHBURY
NAUGATUCK
PROSPECT
EAST HADDAM
SALEM
NORTH STONINGTON
MONTVILLE
LEDYARD
OXFORD
WALLINGFORD
DURHAM
HADDAM
BEACON FALLS
BETHANY
DANBURY
NEWTOWN
HAMDEN
NORTH HAVEN
CHESTER
LYME
EAST LYME
WATERFORD
GROTON
STONINGTON
BETHEL
SEYMOUR
WOODBRIDGE
NORTH BRANFORD
GUILFORD
MADISON
KILLINGWORTH
DEEP RIVER
ESSEX
NEW LONDON
MONROE
ANSONIA
DERBY
RIDGEFIELD
REDDING
NEW HAVEN
EAST HAVEN
OLD LYME
WESTBROOK
OLD SAYBROOK
CLINTON
SHELTON
BRANFORD
EASTON
TRUMBULL
ORANGE
WEST HAVEN
WESTON
STRATFORD
MILFORD
WILTON
BRIDGEPORT
FAIRFIELD
NEW CANAAN
WESTPORT
STAMFORD
NORWALK
GREENWICH
DARIEN
LEGEND: NUMBER OF EMPLOYEES
■ MORE THAN 20,000
▦ 1000 TO 20,000
□ LESS THAN 1000

MANUFACTURING EMPLOYEES BY TOWNS (1955)

FIGURE 10

Petroleum and Coal: The manufacture of roofing and paving materials has been noted to give rise to odors and dust.

Rubber: The rubber industry is located generally in the Bridgeport-New Haven-Waterbury triangle of southwestern Connecticut, but some rubber industry is also to be found in the Middletown area. Air pollutants connected with this industry are primarily odors and dust.

Stone, Clay and Glass Products: Air pollution associated with this industry is primarily in the form of dust caused by the manufacturing of these products.

Primary Metal: The primary metals industry is located in the Bridgeport-New Haven-Waterbury triangle of southwestern Connecticut and in the New Britain-Hartford-Meriden area of the central valley. A vast range of pollutants are emitted to the atmosphere in the smelting, refining, rolling and casting of metals.

Fabricated Metal: The fabricated metal manufacturing centers are Hartford, Waterbury, Bridgeport, New Haven, and Bristol. Hartford has as many employees in this industry as all the other cities combined. Smoke is the usual air pollutant encountered from these industries.

The remaining manufacturing industries in the State (Table 12) contribute to air pollution mainly as the result of their combustion of fuel for heat or power or as local sources of dust or odor.

REFUSE DISPOSAL PRACTICES

Refuse* collection and disposal practices may have a substantial effect on the smoke and odor problems that are associated with disposal of these wastes. Back yard burning of refuse often creates unpleasant odors as well as quantities of smoke and fly ash. The extent of back yard burning depends largely on the quality of the collection service provided.

The methods used in centralized disposal of both garbage and rubbish* may also be important factors in air pollution. There should be no air pollution arising from a properly operated sanitary landfill. Properly constructed and operated incinerators will cause only minimal air pollution problems. The open dump has proven to cause very real air pollution problems. It often catches fire, either from spontaneous combustion or from accidental or purposeful firing by those working on it. Substantial smoke and odor are associated with dump burning, and in many towns this has been the cause of complaints.

---

* Refuse, as defined by the American Public Works Association, includes all solid wastes except body wastes. Rubbish is all refuse from households, stores, and institutions which is not included in garbage and ashes.

A survey was made in 1951* of the refuse disposal practices of all Connecticut towns with over 10,000 population and of seven towns with under 10,000 population (Table 13).

TABLE 13--MUNICIPAL REFUSE COLLECTION AND DISPOSAL IN CONNECTICUT TOWNS[17]

Item	Number of towns
Extent of collection	
100 percent of population served	21
90-100 percent of population served	7
80-90 percent of population served	4
70-80 percent of population served	4
Less than 70 percent of population served	6
Frequency of collection	
Garbage	
2 or more times per week	35
1 to 2 times per week	7
Rubbish and ashes	
1 or more times per week	31
2 times per month	2
Less than 2 times per month	2
Varies	7
Disposal method	
Garbage	
Fed to hogs	19
Dump	7
Incineration	12
Sanitary landfill	5
Rubbish and ashes	
Dump	26
Incineration	11
Both	1
Sanitary landfill	5

One-half of the towns covered by this survey have refuse collection service for the entire population, and in half of the towns some portion of the population does not have this service. Those people without refuse collection service either dispose of garbage, rubbish, and ashes on their own property, or haul it themselves to the dump.

---

* Note: Another survey is being completed early in 1957.

Garbage collection was reported to be made at least once a week in all towns. Rubbish and ash collection varied considerably, and in two towns rubbish and ashes were collected less frequently than once every two weeks.

The most common disposal methods were hog feeding of garbage and dumping of rubbish and ashes. Both of these disposal practices have been the cause of many air pollution problems. Since 1951 a number of towns have abandoned these practices and have changed to incinceration or the use of a sanitary landfill. The State Department of Health has conducted several demonstrations of sanitary landfill to replace open dumps, with invitations to officials of all cities and towns to attend. Progress toward the adoption of this method of disposal or high temperature incineration could well be expedited.

It has been noted, aside from the data furnished in the 1951 survey reported above, that many of the smaller towns have refuse collection service furnished by private collectors. This refuse is placed on the public dump which often has no maintenance. As a result, air pollution problems of smoke and odor frequently ensue.

TRANSPORTATION

Automotive

The role that motor vehicles play in causing air pollution has come under closer observation in recent years. This is related to the increase in the number of vehicles with corresponding increase in motor fuel usage and associated exhaust gases. Current interest in the role of automotive vehicles in air pollution has been heightened by recent findings in Los Angeles where it is reported that the operation of such vehicles is a major contributor to the smog problem.

The gasoline consumed is closely related to the number of registered motor vehicles. Both gasoline consumption and motor vehicle registration have been increasing at the rate of about 5.5 percent per year (Table 14).

Based on total gasoline consumption in the State, it is estimated that 15 tons of sulfur dioxide, 370 tons of unburned hydrocarbons, and from 70 to 300 tons of nitrogen dioxide are emitted daily to the air from motor vehicles.[19] Conditions for heaviest concentration normally occur where traffic is heavy, such as a downtown intersection during

TABLE 14--MOTOR VEHICLE REGISTRATION AND GASOLINE CONSUMPTION (1922-1955)[18]

Year	Motor vehicles	Gasoline consumed (gals.)
1955	983,826	671,318,625
1954	926,313	632,999,399
1953	883,536	608,425,313
1952	840,869	572,620,842
1951	812,874	541,787,880
1950	760,044	509,661,726
1949	703,291	469,496,508
1948	670,779	442,174,400
1947	621,452	421,567,542
1946	578,765	384,544,529
1945	527,834	300,001,381
1940	510,164	369,296,181
1930	360,561	232,646,172
1922	160,491	78,994,504

rush hour; where there are barriers to air circulation, such as tunnels or surrounding buildings; and when the air is calm, so that the pollutants are more slowly diluted with fresh air.

There is an extensive network of motor bus lines and motor common carriers serving the State. There were more than 3200 motor buses and more than 4200 motor trucks registered in 1955. More than three-fourths of the trucks were in interstate commerce.[20] Exhaust fumes encountered in the immediate vicinity of operating diesel trucks and buses are a frequent cause of complaint.

Railroads

The State is served by three operating railroads. The New York, New Haven and Hartford Railroad Company operated 766 miles of track in Connecticut in 1954; the Central Vermont Railway Inc. operated 59 miles; the Branford Steam Railroad Company operated four miles. The New York, New Haven and Hartford Railroad Company employed 432 locomotives, all of which were either diesel or electric. Their main line from New Haven along the coast to New York uses electric locomotives; elsewhere diesel locomotives are used. The Central Vermont Railway Inc. employed 37 steam locomotives and 7 diesel locomotives. The Central Vermont's line runs northward from New London via Norwich, Willimantic and Stafford Springs into Vermont. The Branford Steam Railroad Company employed four steam locomotives and one diesel locomotive.[20]

The large use of diesel and electric locomotives has substantially reduced the amount of air pollution from that which might be expected if an equal number of coal-fired steam locomotives were used.

Marine

The three principal ports serving the State are at New Haven, Bridgeport and New London; smaller ports include Stamford, Norwalk and Greenwich. No data on vessels operating at these ports is included in this report. However, smoke and cinder problems from vessels are common near such harbors.

FUEL USAGE

In 1955, oil was the major fuel used in Connecticut. It is estimated that oil supplied 61 percent, coal 33 percent, and gas 6 percent of the State's fuel needs. The use of oil and gas has been increasing and the use of coal decreasing in recent years (Table 15).

TABLE 15--COMPARATIVE FUEL USAGE
(IN PERCENTAGE OF APPROXIMATE TOTAL THERMS*)

Fuel	1947	1948	1949	1955
Bituminous coal	44.6	42.6	36.6	30.2
Anthracite coal	10.1	8.0	6.9	2.5
Total coal	54.7	50.6	43.6	32.7
Oil (other than gasoline)	45.3	49.4	56.5	61.2
Natural and mixed gas	0.0	0.0	0.0	6.1

* Manufactured gas (unmixed with natural gas) not included in totals (See Table 16).

Gas

Natural gas consumption, first begun in Connecticut in 1952, has increased steadily since. No manufactured gas is now being distributed in the State without admixture of natural gas (Table 16).

The greatest use of gas is for residential heating, although some is used industrially and commercially (Table 17).

TABLE 16--USE OF GAS IN CONNECTICUT BY YEARS[21]
(UNITS--MILLIONS OF THERMS)

Gas	1946-50 (avg.)	1951	1952	1953	1954	1955
Natural	0.0	0.0	9.0	42.6	62.6	83.7
Mixed	0.0	0.0	0.0	17.5	83.5	90.4
Manufactured	97.9	111.3	105.7	63.9	0.0	0.0
L.P.	0.1	0.2	0.2	0.2	0.2	0.2
Totals	98.0	111.5	114.9	124.2	146.3	174.3

TABLE 17--USE OF GAS IN CONNECTICUT IN 1955[21]
(UNITS--MILLIONS OF THERMS)

Class	Total	Natural	Mixed	Manufactured	L.P.
Residential	103.5	42.1	61.2	0	0.2
Commercial	20.6	7.9	12.7	0	0.0
Industrial	49.4	33.0	16.4	0	0.0
Other	0.8	0.7	0.1	0	0.0
Totals	174.3	83.7	90.4	0	0.2

Oil--(other than gasoline)

Oil usage in Connecticut amounted to 29,179,000 barrels (1,223 million gallons) in 1955, an increase of 1.3 million barrels over 1954. The primary use of distillate fuels was as heating oils, while the residual fuels were used in industry, in heating and in electric power plants (utilities). The greatest gain in oil usage was in light heating oils which accounted for about 1.0 million barrels of the increase (Tables 18 and 19).

In addition to the oil use shown in Table 18, 4,973,000 barrels of kerosene were used, mostly as range oil (not classified as a fuel oil by U.S. Bureau of Mines).

Coal

The use of coal in Connecticut has been declining in recent years, largely due to the increased use of fuel oil in residential heating. Somewhat over three million tons of bituminous coal and about 345,000 tons of anthracite were used in Connecticut in 1955.[23,24] Most of the anthracite coal and about 200,000 tons of bituminous were used in

TABLE 18--USE OF OIL IN CONNECTICUT[22](THOUSANDS OF 42 GAL. BARRELS)

Consumer	Distillate fuels				Residual fuels		Total oil	
	1954	1955			1954	1955	1954	1955
	Total	Diesel	Other	Total	Total	Total		
Railroads	866	984	-	984	98	138	964	1,122
Vessels	16	13	-	13	46	81	62	94
Gas and elec. power plants	220	26	22	48	2,544	2,030	2,764	2,078
Industrial	747	164	738	902	5,919	6,390	6,666	7,292
Oil co. fuel	10	3	7	10	40	45	50	55
Heating oils	12,380	-	13,378	13,378	4,118	4,305	16,498	17,683
Military	155	185	-	185	118	108	273	293
Miscellaneous	302	154	131	285	14	11	316	296
Range oil	232	-	266	266	-	-	232	266
Totals	14,928	1,529	14,542	16,071	12,897	13,108	27,825	29,179

TABLE 19--USE OF FUEL OIL AS HEATING OILS IN 1955

Grade of oil	Consumption (bbls.)
No. 1	1,157,000
No. 2	11,407,000
No. 3	63,000
No. 4	751,000
No. 5	1,504,000
No. 6	2,801,000
Total	17,683,000

residential and governmental (schools, institutions, etc.) heating plants. Electric utilities consumed a little over two million tons of bituminous coal and the remaining million tons were used by industry. The use of coal to heat homes has been decreasing rapidly. In 1940, almost a half of the dwelling units in the State were heated with coal; in 1950, just over a fourth of them were. It is estimated that with the increased use of fuel oil and the use of natural gas, this figure dropped to 15 percent for 1956. The use of coal in electric utilities showed a slow but steady decrease between the years 1945 and 1950, dropping from 1.5 million tons to 1.0 million tons. However, with the rising cost of fuel oil, this trend has been reversed; and in 1955, there were 2.2 million tons of coal consumed by the utilities.[25]

Residential Heating Fuel

There has been a great increase in the use of fuel oil and, in recent years, of natural gas for residential heating, whereas there has been a marked decrease in the use of coal (Table 20).

TABLE 20--FUEL USED FOR RESIDENTIAL HEATING IN CONNECTICUT[26]

Fuel	Percent of dwelling units		
	1940	1950	1956 (est.)
Coal	48.4	27.8	15.4
Oil	36.8	58.9	72.7
Gas	1.1	7.1	9.9
Other	13.7	6.3	2.0

The use of fuels for heating is not distributed evenly month by month. Connecticut has about 6000 degree days (65°F base) per year distributed by month as follows:

July	10	January	1125
August	20	February	1060
September	75	March	920
October	350	April	500
November	700	May	170
December	1000	June	90

Consequently, more severe air pollution due to combustion of heating fuels may be expected during cold weather, and also at the beginning and end of the heating season when heating equipment is operated on an intermittent, small fire basis.

Industrial Fuel Usage In 1955

In 1955, the industrial use of fuels amounted to 49.4 million therms of gas; 7,292,000 barrels of fuel oil; and about a million tons (estimated) of coal. No recent data are yet available on the use of fuel by each type of industry; however, 1947 figures were obtained (Table 21).

TABLE 21--USE OF COAL BY MANUFACTURING INDUSTRY, 1947

Industry group	Tons of coal
Food and tobacco	19,000
Textile and apparel	280,400
Lumber and furniture	5,700
Paper and printing	173,800
Chemical	83,500
Rubber and leather	16,100
Stone, clay and glass	26,500
Primary metals	309,800
Fabricated metals	141,000
Machinery	141,500
Transportation equipment	16,800
Instruments and misc.	116,000
Total	1,338,000

Electric Utilities

The electric utilities in Connecticut used 2,248,000 tons of coal, 1,753,000 barrels of fuel oil and 852 million cubic feet of gas in 1955.[27] On a BTU-generated basis, this amounts to 84 percent coal, 15 percent oil and 1 percent gas. As mentioned earlier, the use of coal has increased recently in steam-electric generation because of the favorable price differential indicated below:

coal - 35.5 cents per million BTU
gas - 36.8 cents per million BTU
oil - 39.8 cents per million BTU

Fuel Usage Summary

In Connecticut, fuel oil and natural gas are replacing coal as fuel for residential heating. Diesel fuel has largely replaced coal for locomotives, and industry is using less coal than formerly. The electric utilities have been using increasing amounts of coal in the past few years. On the whole, there has been a decreasing use of coal in the State and this trend will probably continue, as natural gas is made generally available in the State, until some minimum use level is reached, when because of increased utility usage, the tonnage of coal may again be expected to increase.

ANALYSIS OF STATE AND LOCAL LAWS AND ORDINANCES

Eight towns in Connecticut have local ordinances (Appendix F) dealing with one or more phases of air pollution. These towns, Bridgeport, Danbury, East Hartford, Hartford, New Haven, New London, Norwalk, and Stamford, have a population of 768,000 which represents 33.5 percent of the State population.

There are variations among the ordinances as to sources of air pollution to be controlled, method of control and administrative provisions. However, the ordinances have some provisions in common (Table 22).

Occasionally towns have relied on the regulations of the State Sanitary Code to abate air pollution problems. The authority for this action is in Section 3806 of the General Statutes of Connecticut which requires the local director of health to enforce or assist in enforcing the Sanitary Code and rules adopted by the public health council.

The State Sanitary Code contains provisions in Regulations 104-107 which deal in part with air pollution control as follows:

> Regulation 104 requires that refuse storage be done in such a manner that it will not ". . . prejudice the public health."
>
> Regulation 105 requires that manufacturing and other wastes be stored or deposited so that the surrounding atmosphere will not be ". . . contaminated or polluted in such a manner as to injure the public health or create offensive conditions."
>
> Regulation 106 deals with keeping of animals. It requires that pigsties be at least 300 feet from occupied buildings and that dead animals be promptly disposed of.
>
> Regulation 107 requires that public dumps be operated in such a manner as to avoid creating offensive odors, dissemination of dust, and fires.
>
> Section 4205 of the General Statutes prohibits any person to ". . . place, collect or allow

to remain" on his land, ". . . any filthy water, garbage or other filthy or noxious matter, whereby the owner or occupant of land in the vicinity thereof shall be injured or annoyed."

TABLE 22--PROVISIONS OF LOCAL AIR POLLUTION (SMOKE) ORDINANCES

Ordinance provision	Town							
	Bridgeport	Danbury	E. Hartford	Hartford	New Haven	New London	Norwalk	Stamford
I. Designed to control:								
Air pollution					X			
Smoke (soot)	X	X	X	X	X	X	X	X
Fume	X	X			X	X	X	X
Dust	X				X			
Odor	X	X			X			
Fly ash (cinders)		X			X		X	
Method:								
Limit smoke density	X		X	X	X	X	X	X
Use Ringelmann Chart	X		X	X	X	X	X	X
Allow limited time for dense emission of smoke	X		X	X	X	X	X	X
Limit dust-flue gas ratio					X			
Control odor by nuisance		X			X			
Require permits on new equip. or major change on equip.			X	X	X		X	
Control transport of dusty material	X							
Limit use of soft coal						X		X
As constitutes a nuisance		X						
II. Administrative provisions:								
Definitions	X		X	X	X	X	X	X
Responsibility for admin.		X	X	X	X	X	X	X
Hearings			X	X	X			X
Penalty	X	X	X		X		X	X

Additional authority to proceed against those causing air pollution nuisances is contained in Section 8217 of the General Statutes of Connecticut and is entitled, "Abatement of Manufacturer's Nuisance." This states that any person aggrieved by a manufacturing nuisance may request the superior court of the county to order discontinuance or abatement of the nuisance. There are no guidelines stated in this act as to what constitutes a nuisance.

The Sanitary Code Regulations and the Manufacturer's Nuisance Act deal with the more common problems that the State Department of Health has had occasion to investigate. Problems of local enforcement arise in part from the difficulty in defining "nuisance," "prejudice to public health" or "that which creates offensive conditions."

Zoning regulations are used to provide for some measures beneficial to the quality of air resources. These regulations, aside from confining certain industries to a specified section of the city and prohibiting altogether certain other industries (e.g. manufacturing of fertilizer), also contain general clauses, such as ". . . provided that the operation does not produce or emit objectionable dust, smoke, refuse matter, odor, gas, or fumes, or have dangerous or offensive characteristics . . .," or ". . . or any trade or use not stated (prior) injurious to health or noxious by reason of emission of odor, dust, gas or such . . ."

Over 90 percent of Connecticut's population lives in areas with planning and/or zoning programs (Table 23).

TABLE 23--TOWNS WITH PLANNING OR ZONING AGENCIES

Agency	Number	Percentage
Planning and zoning	76	45
Zoning	25	15
Planning	7	4
None	61	36

USE OF RADIOACTIVE MATERIALS

There is one large industry in the State (at Groton) that uses radioactive materials, and two more are under construction (at Middletown and Windsor). Still others are planned. It is expected that the use of radioactive materials will become more widespread in the State.

The need to protect the public from any possible hazard from radioactive substances has been recognized, and regulations are being prepared by the State Department of Health for inclusion in the State Sanitary Code which will deal with radiation sources and radioactive materials. These regulations will require registration of those using radioactive materials.

There have been few data on radioactive air pollutants or background radiation counts, but steps are now being taken toward continuous measurements. Some monitoring of background radiation is being done at the John Pierce Foundation (New Haven). The State is operating a station in Hartford to evaluate radioactive fallout in connection with the Federal Government program and other stations are being established with cooperation from industries in the radiological field.

CONCLUSIONS

1. Air pollution is identified as a problem by governmental officials in a large majority of the cities and towns of the State. Technical data, which would permit a more objective appraisal of the exact nature and extent of the pollution problem, are practically nonexistent. Such data are needed.

2. Important sources of air pollutants in the State include manufacturing, waste disposal, power generation, space and water heating, transportation, and agriculture.

3. Another potential source of air pollution which may become of increasing importance is radioactive contamination. The State Department of Health and private industry are setting up monitoring stations and control methods.

4. Based on the estimated 72% increase in population of the State by the year 2000, with the attending increase in the quantity of pollutant emissions from an increasing number of all types of sources, a need for continuing and comprehensive attention to air pollution problems is indicated.

5. Existing legislation applicable to air pollution matters on a State and local level is in need of careful study. The role of the State and of local agencies should be considered as well as the adequacy of legal provisions for the control of existing and developing problems.

6. It is most desirable that the responsibility and authority for enforcement of air pollution control standards be delegated to the cities and towns. For the more complex problems, many cities and towns cannot be expected to support the technical staff and facilities required; in these matters, they might reasonably look to the State for technical assistance and guidance.

7. In a substantial portion of the cities and towns in the State, air pollutants arising in another political jurisdiction are contributing to or causing a problem. A satisfactory means for bringing about the solution of such problems should be provided where needed.

8. The topographical and climatological features of the State as related to the ability of the atmosphere to disperse pollutants are varied. In general, the areas likely to be of greatest concern are those which lie in the several river valleys of the State where the ability of the atmosphere to disperse pollutants is not as good as in more level terrain. In the highland areas of the

State, the characteristics of the atmosphere with regard to dispersion of pollutants would be expected to be reasonably good.

LIST OF REFERENCES

(1) U.S. Department of Commerce, Bureau of the Census, *U.S. Census of Population, 1950*, Vol. 1, *U.S. Government Printing Office*, Washington 25, D.C., Chapter 7.

(2) Connecticut State Department of Health, *Weekly Health Bulletin*, Vol. 38, No. 13, March 26, 1956.

(3) Fenneman, N.M., *Physiography of the Eastern U.S.*, McGraw-Hill, 1938.

(4) U.S. Department of the Interior, Geological Survey Map of Connecticut, 1893.

(5) Kirk, J.M., *The Weather and Climate of Connecticut*, State Geological and Natural History Survey, Bulletin No. 61, Hartford, 1939.

(6) U.S. Department of Commerce, Weather Bureau, *Monthly Weather Summaries*, U.S. Government Printing Office, Washington 25, D.C.

(7) State of Connecticut Development Commission, *Connecticut Reference Manual of Industrial Location Factors*, State Office Building, Hartford, 1955.

(8) McKain, W.C. and Whettan, N.L., *Occupational and Industrial Diversity in Rural Connecticut*, Storrs Agricultural Experiment Station, College of Agriculture, The University of Connecticut, Bulletin 263, Storrs, Connecticut, November, 1949.

(9) State of Connecticut, *Register and Manual, 1955*, Hartford, 1955.

(10) Connecticut State Department of Labor, Employment Security Division, *Nonagricultural Employment by Industry Group*, 1954.

(11) State of Connecticut, *Industrial Directory of Connecticut, 1947*, Department of Labor, 1947.

(12) U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook for 1952*.

(13) U.S. Department of Commerce, Bureau of the Census, *Preliminary Report, 1954 Census of Manufacturers*, U.S. Government Printing Office, Washington 25, D.C.

(14) Connecticut State Department of Labor, Bureau of Labor Statistics, Statistics for 2nd Quarter, 1955.

(15) Connecticut State Department of Labor, Employment Security Division, Labor Market Letter, Hartford, January, 1956.

(16) Executive Office of the President, Standard Industrial Classification Manual, Vol. 1, Part I, U.S. Government Printing Office, Washington 25, D.C., 1945.

(17) Connecticut State Department of Health, Bureau of Sanitary Engineering, Refuse Surveys of 1951 and 1957 (unpublished).

(18) Connecticut State Department of Motor Vehicles, Facts: 1955, Hartford.

(19) Air Pollution Foundation, Second Technical Progress Report, Report No. 12, Los Angeles, California, November 1, 1955.

(20) State of Connecticut, 44th Annual Report, 1955, Public Utilities Commission, Hartford, 1956.

(21) American Gas Association, Gas Facts for 1955.

(22) U.S. Department of the Interior, Bureau of Mines, Mineral Market Report No. MMS2517, July 3, 1956.

(23) U.S. Department of Commerce, Bureau of the Census, Preliminary Report 1954 Census of Mineral Industries, Bituminous Coal and Lignite Distribution Statistics, December, 1955.

(24) U.S. Department of the Interior, Bureau of Mines, Mineral Market Report No. MMS2451, December, 1956.

(25) Bituminous Coal Institute, Bituminous Coal Annual for the years 1949-52, Washington, D.C.

(26) U.S. Department of Commerce, Bureau of the Census, U.S. Census of Housing (1940 and 1950).

(27) National Coal Association, Steam-Electric Plant Fuel Consumption and Costs, 1955, July, 1956.

(28) Federal Security Agency (now U.S. Department of Health, Education, and Welfare), Public Health Service, Air Pollution in Donora, Pa., Preliminary Report, Public Health Bulletin No. 306, 1949.

(29) Mills, Clarence A., Air Pollution and Community Health, Boston Christopher Publishing House, 1954.

AIR POLLUTION POTENTIAL OF THE LARGER CITIES AND TOWNS

The detailed data upon which these appraisals are based are incorporated in the body of the report and also in Tables 24, 25, and 26 which immediately follow this discussion.

HARTFORD

Hartford, the largest city in the State, currently experiences some pollution of its atmosphere. Specific problems which have occurred during the past two years include:

Smoke from certain public, commercial, and industrial heating plants.

Smoke and odor from residential incinerators.

Odor from a rubber reclaiming plant.

Dust from a gravel road.

Smoke and odor from scrap iron salvage.

Smoke and soot from cable salvage.

White smoke and fumes from brass foundry.

Smoke and dust from iron foundry.

In addition to the smoke abatement ordinance (Appendix F), there is one section of the Heating Code which establishes requirements for stokers that will prevent smoke or fly ash emission.

The factors contributing to a potential air pollution problem include: (1) the population: extent, density, and growth rate, with the accompanying pollution sources such as motor vehicles and heating plants; (2) the type and extent of industrial development; and (3) the valley form of topography and the relatively high incidence of calm wind conditions. The refuse disposal procedures are no longer a threat to clean air.

BRIDGEPORT

Bridgeport is the largest manufacturing center in the State and ranks second in population. It was reported that there are many sources of air pollution. These were not itemized, although the following were mentioned:

Smoke and odor from industrial metal-cleaning operations and the burning of auto bodies.

Odor from wire cable production operations.

Smoke from public schools and apartment houses.

Population density and growth trends, the extent of industrial development, and the existence of major local problems evince an adverse current and potential air pollution situation. The meteorological conditions are generally favorable to the dispersion of pollutants (except for early morning temperature inversions) and the refuse disposal practices are not considered to be a problem.

No one has been delegated the responsibility of enforcing the Dust and Smoke Ordinance (Appendix F) but when severe problems arise, the city and State health departments investigate. Enabling legislation was passed in 1955 which authorizes the Common Council to adopt a comprehensive ordinance for the control of air pollution.

NEW HAVEN

This is the third largest city in the State, the second largest manufacturing center, and a major rail transportation center. A review of approximately 90 investigations of air pollution sources showed that 80 percent involved smoke or soot and 20 percent odor and dust. Residential and apartment buildings were the site of 16 percent of these sources, 50 percent were at commercial, government and school buildings, 25 percent concerned industry, and 9 percent implicated the burning of debris.

The density of population, extent and type of industry, and the practice of disposing of garbage to hogs and rubbish to a dump are cited as the factors contributing to an adverse, potential air pollution problem. The use of coal for heating is decreasing rapidly--it was used by 47.6 percent of the dwellings in 1940 and by only 26.6 percent in 1950. The geographical location of the city on Long Island Sound and the associated level coastal plain with the accompanying climatology are generally favorable to adequate dispersion of pollutants. However, although calms are prevalent only 5 to 15 percent of the time, temperature inversions are reported as occurring frequently. In the early fall of the year these stable air conditions are complemented by light surface winds and thus pollutants are dispersed slowly. Observers at the New Haven Airport reported seeing as many as three consecutive days when there were continuous heavy smoke conditions over the city.

In 1953, an air pollution ordinance became effective (Appendix F) which has been enforced through the part-time activities of the director of environmental sanitation and a sanitarian.

WATERBURY

This center of the brass industry of the country is the fourth largest city in the State, having an estimated July 1956 population of 112,200.

Problems noted in the last few years include acid fumes and smoke from a screw and rivet plant, and smoke and soot from several private dumps, a manufacturing plant and a dairy.

Again, the population density and growth plus the extent and type of industry and the steep, narrow valley topography constitute factors contributing to a potential air pollution problem. Refuse disposal is by means of an incinerator and is not now an adverse factor.

NEW BRITAIN

New Britain city represents a major portion of the New Britain-Bristol urbanized area which had a 1950 population of 123,079. It is located on the generally level or gently rolling terrain of the central valley and experiences the high incidence of calm wind conditions typical of the area. It is a manufacturing center, having over two-thirds of its total labor force engaged in this activity. The manufacture of hardware and ball bearings is the specialty here.

All refuse is collected by the city and is incincerated. The major factors contributing to a potential problem then are the population density and growth rate plus the extent and type of industrial development.

STAMFORD

This city, the sixth largest, experienced the largest percentage of growth during the 1940 to 1950 period than any of the sixteen largest cities of the State--a 55 percent increase. Stamford town represents the major component of the Stamford-Norwalk urbanized area which had a 1950 population of 173,536 people.

Air pollution problems have included those of smoke, soot, odor, and dust. Soiling of laundry, soot on cars and window sills have been frequently cited as evidence of air pollution. Sources of these problems include:

Residential, apartment house, hospital, and office building heating plants and incinerators.

Laundry.

Lock manufacturer.

Burning of auto bodies.

Plastic manufacturer.

Aluminum die-casting manufacturer.

Painting operations.

Heavy trucking.

Chemical manufacturer.

Rubber company.

Public utility.

Although the building department receives many of the smoke complaints, it is not staffed to handle these effectively.

The rate of growth is probably the principal factor contributing to a potential air pollution problem here. All refuse is collected by the city and incinerated. Like Bridgeport, the climatology and topography are generally favorable to the dispersion of pollutants. Industrial development has been substantial and may well be considered an adverse factor.

NORWALK

Norwalk is a port, a manufacturing center, and a summer resort. It is the second major component of the Stamford-Norwalk urbanized area mentioned above.

The town dump and incinerator are located on the river near the center of town and constitute a problem of smoke and odor. Other problems include:

Smoke from auto burning, clothing manufacture, chemical laboratory, commercial buildings and schools, and from a utility company.

Smoke and odor from residential rubbish burning.

Odor from tire company.

The ordinance creating a commission on smoke regulation and regulating emissions was adopted in 1931 (Appendix F). State Sanitary Regulations (Sec. 105) are also used in abating air pollution problems.

The population increase from 1940 to 1950 was 24.1 percent and, like Stamford, constitutes the principal factor affecting the air pollution potential of this area. The topography and climatology are again generally favorable to dispersion of pollutants. The town dump is activated when the incinerator is overloaded or out of order.

WEST HARTFORD

Part of the town of West Hartford is included in the Hartford metropolitan area which had a 1950 population of 300,788. Note that the population increase from 1940 to 1950 was 31.4 percent while that of Hartford was only 6.7 percent. To a large extent, it is a residential area but carries on some manufacturing in the fabricated metals and machinery categories.

Problems have included smoke from the town dump and the armory and school heating plants as well as smoke and odor from residential incinerators. Refuse disposal practices coupled with rapid population growth probably contribute more toward air pollution than the factors of topography, climatology, or industrial density and growth. A municipal refuse incinerator is under construction and will soon be in operation.

MERIDEN

Meriden is an important manufacturing center and is known as the "Silver City" because of the large production of silverware. Approximately three-fourths of its total labor force is engaged in manufacturing.

The only significant problem of recent years was smoke and fumes arising from a plant producing molded plastics. Occasional problems arise due to smoke from heating plants. The City Code contains a specific section (Chapter 11, Section 15), outlawing dense smoke and obnoxious fumes or odors.

Hills rise 500 to 700 feet above the valley floor on the northwest, north, and east borders of Meriden and, in the sense that this probably affects the meteorology, it may constitute a factor adverse to the air pollution potential of Meriden. Another factor might be the extent of industrial development.

GREENWICH

Part of Greenwich town constitutes the southeast portion of the Stamford-Norwalk urbanized area described earlier in this appendix. It is primarily a residential suburb of the metropolitan area but there is some industry, notably printing and publishing.

A foundry has been the source of smoke and fly ash. In recent years there have been problems from apartment incinerators and the town incinerator and dump. Other problems include:

Smoke and odor from three dry cleaning establishments and an asphalt plant.

Fly ash from a felt company's heating plant.

Dust from the Connecticut thru-way construction.

The potential for an adverse air pollution situation in the forseeable future does not appear to be great in Greenwich.

BRISTOL

Bristol is one of the components of the New Britain-Bristol metropolitan area which had a 1950 population of 123,079. Bristol has extensive industry in the fabricated metal and machinery field but there have been no complaints concerning air pollution. Probably the principal factor pertaining to a potential problem is the practice of disposing refuse on hog farms and the town dump.

STRATFORD

Part of Stratford town is included in the Bridgeport urbanized area whose 1950 population was 237,435. Eighty percent of the population is engaged in manufacturing.

The utility power plant in Milford, to the east, is a source of smoke and dust, and a group of industries in Bridgeport to the west have been a source of smoke and soot problems in western portions of Stratford. Within the town, a manufacturer of brake linings and a manufacturer of roofing materials have been reported to produce odors. Dust problems are expected to arise from construction of the new thru-way.

Like Bridgeport, topography and climatology are generally favorable to dispersion of pollutants and refuse disposal is not an adverse factor. The rapid growth rate from 1940 to 1950 of 47.9 percent probably contributes most toward a potential air pollution problem.

MANCHESTER

Manchester is about 10 miles east of Hartford and part of the town constitutes a portion of the Hartford metropolitan area. No problems have been reported and the high population growth rate appears to be the major factor contributing to an adverse air pollution potential.

FAIRFIELD

Located next to Bridgeport, part of Fairfield town is included in that urbanized area. Again, the factor of rapid growth in population is noted--44.3 percent in the decade from 1940 to 1950. Refuse disposal is on a dump with some provision of earth cover.

Recent pollution problems include:

Smoke from a foundry and laundry.

Fumes from a silver refinery and diesel trucks.

Fly ash from a plastics manufacturer.

Odor from a pharmaceutical manufacturer.

NORWICH

This textile center is the largest city of Eastern Connecticut. Air pollution problems are primarily those of smoke from industrial heating and power plants. This fact, plus the practice of disposing refuse on an open dump are probably the leading factors contributing to a potential air pollution problem.

DANBURY

Located in the western hills near the New York State boundary, Danbury has a large textile industry, manufacturing hats, hatters' fur, and fur for trimming. The major problem is that of malodor associated with this industry. The problem is widespread because of the large number (25) of firms producing hatters' fur. Residential incineration of rubbish causes smoke and odor.

Although no information was available concerning the occurrence of calms or inversions, the area bears surveillance since it may combine the topographical, meteorological and pollution source features that produce air pollution problems.

MILFORD

Part of the populace of Milford town is included in the 244,836 population of the New Haven metropolitan area. Air pollution problems include:

Smoke and dust from utility power plant.

Smoke and odor from residential incinerators and the town dump.

The topography is low and flat and the climatology is similar to that of Bridgeport. Calms are relatively infrequent but morning temperature inversions are frequent. The high population increase of 63.4 percent and the use of the open dump were considered to be the principal factors which may cause an air pollution problem in Milford. The dump was to have been replaced in late 1956 by a sanitary landfill.

EAST HARTFORD

East Hartford is the home of Pratt and Whitney (United Aircraft Corporation). Recent unpublished data indicate that the aircraft industry alone employs around 35,000 persons. The population growth in the decade from 1940 to 1950 (60.7 percent) calls attention to this as a factor contributing to a potential air pollution problem. Another is the refuse disposal practices of dumping and hog feeding. Recent air pollution problems include:

Smoke and odor from the town dump and residential burning of rubbish.

Smoke from apartment houses, industrial incinerators, and laundries.

Odor from laboratories and swampy land along the river.

Fumes from spray painting operations.

Dust from road traffic and agricultural operations.

Pollution from adjacent towns, including smoke and dust from utility power plant, incinerators, dump and junk burning, and from a cement plant.

There is a new municipal incinerator being placed in operation as this report is being written.

HAMDEN

Part of the town of Hamden is included in the New Haven urbanized area. As such, it experiences the problem of receiving smoke and odor from the New Haven dump. However, Hamden also has a smoldering dump which has aroused interest in an incinerator and sanitary landfill. There were a number of additional major problems but these have been reduced by changing fuel or firing procedures. One problem, involving the release of fumes and odors from a wire enameling process, has been prevalent for 30 years. Recently the company began installing catalytic burners on individual furnaces.

WEST HAVEN

The metropolitan area of New Haven extends into the town of West Haven. The topography and climatology of the two towns are similar, being generally favorable to the dispersion of pollutants.

Only occasional problems have been noted, among which were smoke and odor from a tire manufacturing plant, odor from dry cleaning plants and the town dump, and dust from highway traffic.

The factors which forewarn of a potential air pollution problem are the population density and refuse disposal practices.

NEW LONDON

Problems noted in New London have included smoke from government buildings and odor from the manufacture of linoleum, from the municipal incinerator, from the mud flats along the coast, and from a pharmaceutical manufacturing plant across the river. Changes in the facilities at the municipal incinerator have resulted in improvements. The population density is relatively high, but otherwise the factors pertaining to potential air pollution problems are generally favorable to the dispersion of pollutants.

MIDDLETOWN

Middletown has noted air pollution problems such as:

Smoke and odor from a chemical company, residential incinerators, and the dump across the river.

Fumes from a rubber plant.

Smoke and soot from department stores.

Solvent vapors from dry cleaning plants.

Most of the population live in the Connecticut River valley where stable air conditions due to nocturnal temperature inversions are common during summer nights. Another factor receiving attention is the use of radioactive materials by industry. Such a plant is under construction here.

TORRINGTON

Although there have been few complaints or problems reported, Torrington is located in the deep and narrow Naugatuck River valley where the factors of topography, meteorology, and pollution sources may combine to cause a problem.

The only problem reported was smoke from a foundry but garbage is fed to hogs and other refuse is placed on a dump.

GROTON

Groton appears to experience the highest incidence of complaints (one a day) of the 25 largest cities in the State. Problems include:

Odor from a manufacturer of antibiotics.

Smoke and dust from a manufacturer of submarines (sand blasting).

Dust from a gravel company.

The topography and climatology are generally favorable to pollutant dispersion except for frequent morning temperature inversions. Refuse disposal and a very rapid population growth rate are the two major factors forewarning of a potential air pollution problem. In addition, the use of radioactive materials by a large industry bears surveillance.

WALLINGFORD

Wallingford is located just far enough from the coast to miss the favorable land-sea breeze regime.

The use of a sanitary landfill has replaced the practices of feeding garbage to hogs and using a dump for the disposal of other refuse. The main problem now is a smoke, soot, fly ash and odor problem from the overloaded local utility company which burns soft coal.

TABLE 24 - AIR POLLUTION POTENTIAL OF THE LARGER CITIES AND TOWNS - GENERAL FACTORS

City or town	Population			Topography		Transportation				
						Motor vehicles registered			Fuel used on railroad	Seaport tons of commerce handled (1953)
	Persons 1956	Persons per sq.mile	Per cent increase 1940-1950	State zone (Fig.4)	Generalized microtopography	1955	1948	Per cent increase 1948-1955		
Hartford	185,900	9,995	6.7	I	Flat - open	59,006	45,262	30.3	Diesel	-
Bridgeport	168,500	9,413	7.9	II	Coastal	59,112	45,920	28.8	Electric	2,185,521
New Haven	165,400	7,351	2.4	II	Coastal	58,953	42,923	37.3	Diesel & Elec.	6,122,944
Waterbury	112,200	3,979	5.2	III	Bowl	36,694	26,662	37.5	Diesel	-
New Britain	84,300	6,109	7.3	I	Level	26,713	19,294	38.4	Diesel	-
Stamford	84,100	2,145	55.0	II	Coastal	31,109	18,988	63.6	Electric	727,618
Norwalk	58,600	1,928	24.1	II	Coastal	13,769	8,115	69.6	Electric	226,097
West Hartford	55,100	2,551	31.4	I	Level	22,135	13,870	59.4		-
Meriden	48,900	2,081	11.6	I	Hilly	18,065	11,651	55.0	Diesel	-
Greenwich	48,700	959	11.6	II	Coastal	12,421	8,743	42.0	Electric	80,708
Bristol	43,500	1,605	19.2	I & III	Hilly	13,676	9,821	39.0	Diesel	-
Stratford	41,500	2,161	47.9	II	Coastal	16,347	10,055	63.0	Electric	-
Manchester	38,700	1,402	43.3	I	Sl. hilly	16,176	10,365	56.0	Diesel	-
Fairfield	38,600	1,261	44.3	I	Coastal	13,998	7,468	87.0	Electric	-
Norwich	37,700	1,287	10.2	II & IV	Hilly	13,317	9,312	43.0	Coal	-
Danbury	37,600	881	8.7	III	Hilly	15,418	9,954	55.0	Diesel	-
Milford	37,000	1,568	63.4	II	Coastal	11,367	6,340	79.0	Electric	3,181
East Hartford	36,900	2,028	60.7	I	Flat	17,649	10,340	71.0	Diesel	-
Hamden	36,000	1,088	27.1	II	Sl. hilly	14,503	9,448	53.0	Diesel	-
West Haven	35,900	3,205	6.6	II	Coastal	13,924	9,232	51.0	Electric	-
New London	31,000	5,000	0.3	II	Coastal	11,924	8,959	33.0	Diesel & Elec.	910,679
Middletown	29,800	642	12.1	I	Hilly	11,281	8,174	38.0	Diesel	-
Torrington	29,600	773	3.1	III	Hilly & valley	13,147	9,592	37.0	Diesel	-
Groton	26,600	741	101.0	II	Coastal	4,667	2,748	70.0	Diesel	-
Wallingford	23,500	561	14.8	II	Sl. hilly	8,477	5,114	65.0	Diesel	-

TABLE 24 (CONT'D.) - AIR POLLUTION POTENTIAL OF THE LARGER CITIES AND TOWNS - GENERAL FACTORS

City or town	**Refuse disposal (Data for 1951)**					**Heating (Data for 1950)**			
	Per cent of population served	Frequency of collection		Disposal practice		Number of dwelling units using			
		Garbage	**Rubbish and ashes**	**Garbage**	**Rubbish and ashes**	Coal	Oil	Gas	Other
Hartford	100	2/wk.	Varies	Incinerator	Incinerator	16,105	27,085	5,070	2,970
Bridgeport	95	2/wk.	1/wk.	Incinerator	Incin. & Dump	12,710	25,100	5,210	2,315
New Haven	100	2/wk.	Varies	7 hog farms	Dump	12,305	24,575	6,030	3,255
Waterbury	100	3/wk.	Varies	Incinerator	Incinerator	7,305	17,460	3,315	1,205
New Britain	100	1-2/wk.	1/wk.	Incinerator	Incinerator	6,175	12,305	1,380	930
Stamford	100	2/wk.	1/wk.	Incinerator	Incinerator	4,105	12,050	2,285	1,310
Norwalk	71	2/wk.	2/wk.	Incineration (a)	Incineration (a)	4,165	8,540	870	475
West Hartford	100	2/wk.	Varies	4 hog farms (b)	Dump (b)	-	-	-	-
Meriden	75	2/wk.	2/wk.	Land fill	Land fill	4,250	7,955	640	240
Greenwich	100	2-3/wk.	2-3/wk.	Incinerator	Dump	-	-	-	-
Bristol	100	1-2/wk.	1-2/wk.	Hog farms	Dump	3,430	5,875	270	675
Stratford	100	1/wk.	1/wk.	Land fill	Land fill	-	-	-	-
Manchester	100	2/wk.	2/wk.	Land fill	Land fill	-	-	-	-
Fairfield	80	2/wk.	2/wk.	Dump	Dump	-	-	-	-
Norwich	75	1/wk.	1/wk.	Dump	Dump	2,030	3,990	435	705
Danbury	100	1/wk.	1/wk.	Dump	Dump	1,465	3,750	585	480
Milford	90	2/wk.	2/wk.	Land fill	Land fill	-	-	-	-
East Hartford	100	2-3/wk.	2-3/wk.	Hog farms	Dump	-	-	-	-
Hamden	80	2/wk.	Varies	Hog farms	Dump	-	-	-	-
West Haven	100	2/wk.	2/wk.	Hog farms	Dump	-	-	-	-
New London	100	2/wk.	2/wk.	Incinerator	Incinerator	2,750	5,150	555	135
Middletown	67	2/wk.	2/wk.	Incinerator	Incinerator	1,880	4,350	265	820
Torrington	90	2/wk.	Varies	Hog farms	Dump	2,170	5,385	280	315
Groton	60	2/wk.	2/wk.	Dump	Dump	695	1,110	15	70
Wallingford	67	1-2/wk.	Varies	Land fill	Land fill	1,230	2,190	130	95

(a) Large dump used for incinerator overload

(b) Expect to have incinerator by fall 195

TABLE 25 - AIR POLLUTION POTENTIAL OF THE LARGER CITIES AND TOWNS - INDUSTRIAL FACTORS

City or town	Total labor force	Ratio: total labor force to population	General industry	Manufacturing labor force	Ratio: mfg. labor force to total labor force	Number of firms in given manufacturing industry (Number with over 500 employees in parentheses)					
						Ordinance	Food	Textile	Apparel	Lumber and furniture	Paper
Hartford	97,000	0.52	Insurance; govt.; mfg.	31,000	0.32	1 (1)	52	2	30	30	7
Bridgeport	82,000	0.49	Largest mfg. center	55,000	0.67	3 (1)	35	8 (1)	62 (1)	20	9
New Haven	68,100	0.41	Transportation; mfg.	32,000	0.47	4 (2)	46	4	107 (1)	39	15 (2)
Waterbury	41,500	0.37	Brass industry	29,000	0.70	0	36	0	15 (1)	11	4
New Britain	28,000	0.33	Hardware; bearings	20,500	0.73	0	19	1	10	9	0
Stamford	27,500	0.33	Boat building; mfg.	14,500	0.53	0	17	4	21	10	3
Norwalk	18,000	0.31	Summer resort; mfg.	12,000	0.67	1 (1)	17	19 (1)	34	10	5
West Hartford	13,000	0.24	Residential area	7,000	0.54	0	2	0	1	6	1
Meriden	15,700	0.32	Silverware	11,000	0.70	0	9	1	4	5	1
Greenwich	11,000	0.23	Publishing	5,400	0.49	0	4	1	5	8	0
Bristol	13,000	0.30	Ball bearings	10,500	0.81	0	5	1	0	1	1
Stratford	10,000	0.24	Residential	8,000	0.80	0	5	0	1	2	0
Manchester	7,100	0.18	Tobacco processing	3,400	0.48	0	4	1	1	2	3
Fairfield	5,000	0.13	Residential	3,000	0.60	1	3	0	1	2	0
Norwich	10,000	0.27	Textile center	5,500	0.55	0	7	22 (2)	12	7	2
Danbury	12,000	0.32	Hats & hatters' fur	7,600	0.63	0	4	39 (2)	9	6	2
Milford	5,500	0.15	Seeds shellfish	3,100	0.56	1 (1)	3	0	4	1	0
East Hartford	32,000	0.87	Aircraft	27,000	0.84	0	9	0	0	4	3
Hamden	8,000	0.22	Agriculture; mfg.	4,600	0.58	1	8	2	0	5	2
West Haven	4,800	0.13	Residential	2,400	0.50	0	6	2	0	9	0
New London	8,000	0.26	Ship building; mfg.	2,400	0.30	0	19	2	12	4	2
Middletown	7,800	0.26	Agr.; mfg.; mining	4,300	0.55	0	4	6 (1)	7	2	3
Torrington	11,800	0.40	Mfg.	8,000	0.68	0	12	1	1	4	0
Groton	7,600	0.29	Fishing; submarines	6,400	0.84	0	2	1	1	0	0
Wallingford	7,500	0.32	Silverware	5,900	0.79	0	3	2	7	4	0

TABLE 25 (CONT'D.) - AIR POLLUTION POTENTIAL OF THE LARGER CITIES AND TOWNS - INDUSTRIAL FACTORS

City or town	Number of firms in given manufacturing industry (Number with over 500 employees in parantheses)											
	Printing publishing	Chemical petroleum and coal	Rubber	Leather	Stone, clay & glass	Primary metals	Fabricated metals	Machinery	Electrical equipment	Transportation equipment	Instruments	Misc.
Hartford	72	7	1	2	11	7	71 (1)	80 (5)	13 (1)	11 (1)	11 (1)	27 (1)
Bridgeport	36	9	5	8	18	27 (3)	73 (3)	118 (5)	22 (5)	11 (2)	7 (2)	32 (1)
New Haven	55	17	5	3	11	13 (2)	64 (2)	54 (1)	19	9 (1)	5 (1)	28
Waterbury	16	7	0	3	3	18 (3)	80 (3)	45 (3)	5 (1)	5	8 (3)	32 (1)
New Britain	11	1	0	0	0	6	30 (4)	46 (2)	5 (1)	3	1	5
Stamford	38	20 (1)	1	2	2	10	33 (2)	30 (4)	26	7	5	11
Norwalk	14	12	4	13	7	5	31	28 (2)	11 (1)	3	6	23
West Hartford	5	1	1	1	1	3	9	27 (2)	4	2	0	2
Meriden	10	3	0	0	4	6	19	19 (1)	4 (1)	2 (1)	1	26 (7)
Greenwich	16 (1)	1	0	0	0	3	11	10	1	2	3	7
Bristol	3	2	0	0	1	2 (1)	24 (1)	19 (1)	3	0	4 (2)	4
Stratford	2	5	2	0	4 (1)	6	11	24	4	5 (1)	1 (1)	5
Manchester	2	2	1	2	1	0	7	15	1	1 (1)	0	4
Fairfield	1	1	1	0	1	3	6	13	1	0	0	3
Norwich	5	2	0	8	3	0	5 (1)	4	0	0	0	0
Danbury	3	3	1	2	4	3	11	23 (1)	8	4	3 (1)	3
Milford	3	4	0	1	5	0	23	27	3 (1)	5	2	3
East Hartford	1	3	0	0	2	2	6	18	1	1 (1)	2	3
Hamden	3	1	0	0	6	4	9	14	3 (2)	1 (1)	0	10 (1)
West Haven	1	5	2	0	3	7	15	8	3	3	1	4
New London	11	2	0	0	0	1	9	4	2	2	0	1
Middletown	6	2	3 (1)	0	3	1	17	5	4	4	0	3
Torrington	3	0	0	0	4	3 (1)	8 (1)	11 (3)	1 (1)	0	0	2 (1)
Groton	1	1 (1)	0	0	0	2	1	0	1	1 (1)	0	0
Wallingford	2	2 (1)	0	0	2	1	11 (1)	9	3	0	2	17 (6)

TABLE 26 - AIR POLLUTION POTENTIAL OF THE LARGER CITIES AND TOWNS - PROBLEMS AND CONTROLS

City or town	City depts. supplying information	Reported number of complaints received per year	State Dept. of Health investigations in past 10 yrs.	Air poll. from an adjacent town	Studies or surveys of air pollution made	Legislation or regulation (other than State Sanitary Code)	Dept. exercising control over nuisances (n) and smoke (s)
Hartford	Health & Bldg.	23	5	No	Yes	Smoke ord.	Hlth.-n; Bldg.-s
Bridgeport	Health, Bldg., & Fire	-	15	No	Yes	Smoke ord.	(Little control)
New Haven	Health	100+	2	Yes	Yes	Air poll. ord.	Health-n,s
Waterbury	Health & Plan. Comm.	5	8	No	Yes	(None)	Health-n
New Britain	Health, Bldg., & Fire	3	1	No	No	Heat. code	Health-n
Stamford	Health & Bldg.	20	3	No	No	Smoke ord.	Hlth.-n; Bldg. & Fire-s
Norwalk	Health	17	4	No	No	Smoke comm.	Health-n
West Hartford	Health	12	2	No	No	(None)	Health-n
Meriden	Health	3	4	No	No	City code	Health-n,s
Greenwich	Health	5	4	No	No	City code	Health-n,s
Bristol	Health & Pub. Wks.	-	3	No	No	(None)	(None)
Stratford	Health	5	1	Yes	Yes	(None)	Hlth. & Fire-n,s
Manchester	Health	-	3	No	No	(None)	(None)
Fairfield	Health	5	3	No	No	Town regs.	Health-n,s
Norwich	Health & Fire	100	3	No	Yes	(None)	Fire & Hlth.-n,s
Danbury	Health	"Many"	11	No	Yes	City ord.	Health-n,s
Milford	Health	30	2	Yes	No	(None)	Health-n,s
East Hartford	Health	40	2	Yes	Yes	Smoke ord.	Hlth.-n; Fire & Pub. Wks.-s
Hamden	Health	50 to 100	4	Yes	No	(None)	Health-n,s
West Haven	Health	"Few"	1	No	No	(None)	Health-n,s
New London	Health & Bldg.	"Few"	1	Yes	No	Smoke ord.	Hlth.-n; Bldg.-s
Middletown	Health	18	1	Yes	No	(None)	Health-n,s
Torrington	Health	-	0	No	No	(None)	(None)
Groton	Health	1 per day	10	No	No	(None)	Health-n,s
Wallingford	Health	"Few"	2	No	No	(None)	(None)

FIGURE 11

INTERVIEW DATA SHEET - PART 1

AIR POLLUTION SURVEY
CONNECTICUT STATE DEPARTMENT OF HEALTH
MAY 1956

Town: ____________________

Persons Interviewed: ____________

____

Date: ____________________

I. Town description:

1. Estimated population (July 1, 1956) ____________
2. Labor force (June 1955) ____________
3. Number of manufacturing employees (June 1955) ____________
4. Predominant industry ____________; number of employees ____________
5. Topography ____________

II. Remedial action:

1. Legal controls

(a) Air pollution control ordinance: yes ____ no ____

(b) Air pollution control provisions in:

Zoning ordinance: yes ____ no ____ Ordinance not examined ____

Heating ordinance: yes ____ no ____ Ordinance not examined ____

Incinerator ordinance: yes____ no____ Ordinance not examined ____

Pollen control: yes ____ no ____ Ordinance not examined ____

Nuisance regulations: yes____ no____ Ordinance not examined ____

2. Activity

(a) Studies or surveys: date ______ by ____________

(b) Complaints received: Number/year ____________, none ____________

(c) Problems investigated by: H.D., F.D., B.D.______, none ____________

(d) Problems investigated by: S.H.D. ____________

(e) Time on air pollution: (man months per year) ____________

FIGURE 12

INTERVIEW DATA SHEET - PART II

III. Problem evaluation

Source of Air Pollution	No. of Prob.	Severity of Problem			Type of Pollution				Heat. Plant	Incin-erator	Sources in other municipalities
		Major	Minor	Neg.	Smoke	Dust	Odor	Fumes			
Total											
Private Homes											
Apartments											
Hotels											
Office Bldg.											
Store											
Bakery											
Laundry											
School											
Hospital											
Incinerator											
Dump											
Vehicle exhaust											
Utility											
INDUSTRY:											
Textile											
Lumber & furn.											
Paper											
Chemical											
Drugs											
Petroleum & Coal											
Rubber											
Leather											
Stone, clay, glass											
Primary metal											
Fabricated metal											
Mining											
Miscellaneous											

FIGURE 13

QUESTIONNAIRE DATA SHEET

CONNECTICUT STATE DEPARTMENT OF HEALTH

AIR POLLUTION STUDY

1. Are there any operations in your town that emit noticeable amounts of smoke, dust, or odor to the atmosphere?

Yes ______________ No ________________

2. Are the smoke or other pollutants great enough to cause in your opinion:

(a) Measurable discomfort or inconvenience to residents: Yes ________No______

(b) Damage to property: Yes __________ No ____________

3. Do you receive any complaints of air pollution? Yes ________ No _________

4. Are there any local ordinances or regulations for the control of smoke, dust, odor?

Yes ________________ No __________________

5. Please describe any local steps, if any, that have been undertaken to examine or abate air pollution, such as surveys, inspections, or complaint investigations:

____

____

____

____

____

______________________ ______________________

City or Town Signature

Please return to Director, Bureau of Sanitary Engineering, State Department of Health, Hartford, Connecticut.

APPENDIX C

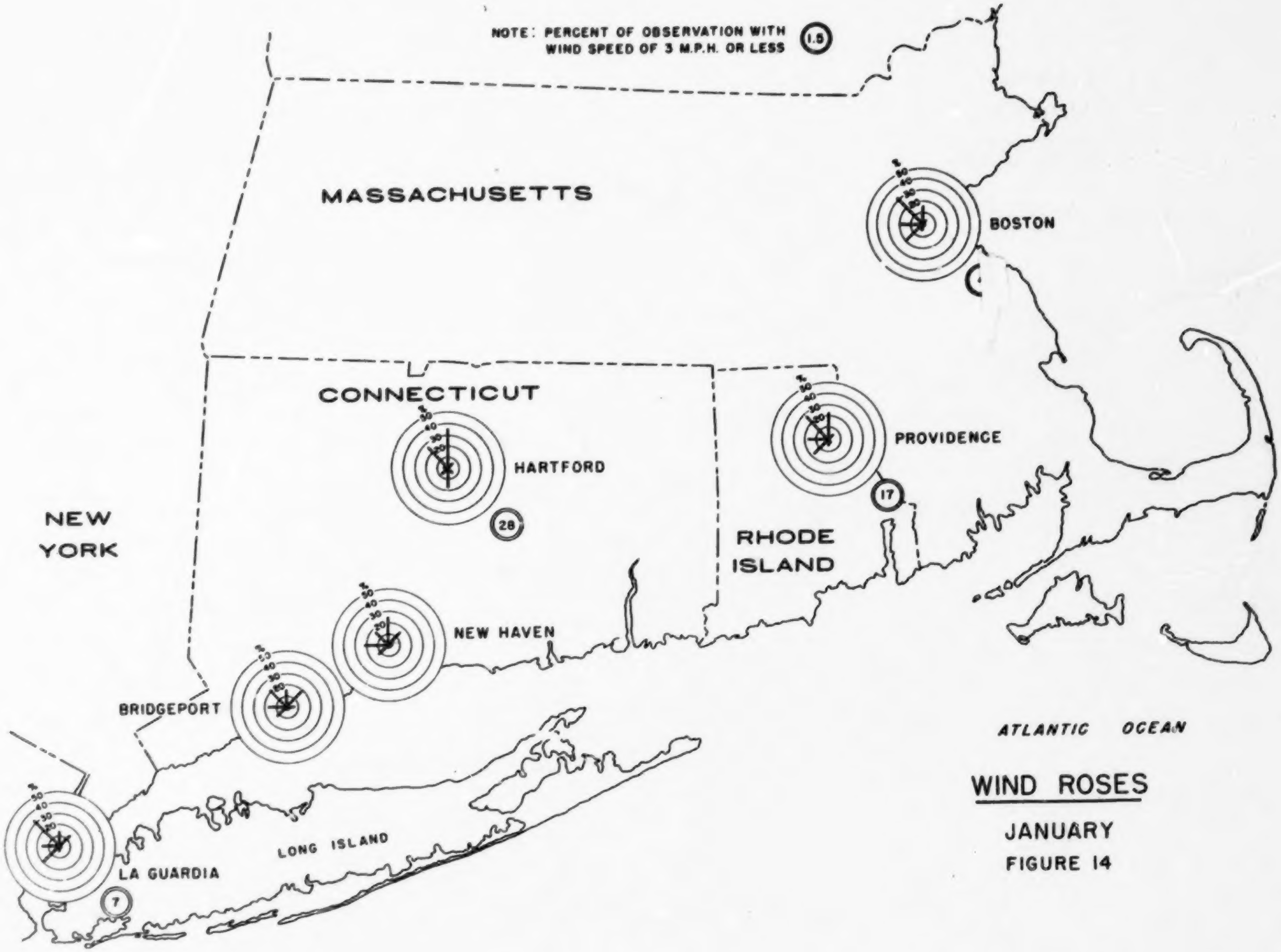
SURVEY COVERAGE BY INTERVIEWS AND QUESTIONNAIRE

TABLE 27--SURVEY COVERAGE BY INTERVIEW AND QUESTIONNAIRE

City or town	Population	Visited	Questionnaire	Did not answer questionnaire	City or town	Population	Visited	Questionnaire	Did not answer questionnaire
Hartford	185,900	X			Watertown	12,400			X
Bridgeport	168,500	X			Plainville	12,200			X
New Haven	165,400	X			Newington	12,100		X	
Waterbury	112,200	X			Winchester	11,900		X	
New Britain	84,300	X			North Haven	11,900		X	
Stamford	84,100	X			Killingly	11,200			X
Norwalk	58,600	X			Glastonbury	11,000			X
W. Hartford	55,100	X			Mansfield	10,900		X	
Meriden	48,900	X			Derby	10,700			X
Greenwich	48,700	X			Putnam	10,000			X
Bristol	43,500	X			New Canaan	9,800		X	
Stratford	41,500	X			Berlin	9,700			X
Manchester	38,700	X			Seymour	9,100			X
Fairfield	38,600	X			Plainfield	8,800			X
Norwich	37,700	X			Farmington	8,700		X	
Danbury	37,600	X			Cheshire	8,300		X	
Milford	37,000	X			Bloomfield	8,200	X		
E. Hartford	36,900	X			Plymouth	8,000		X	
Hamden	36,000	X			Stafford	7,300			X
W. Haven	35,900	X			Windsor Locks	7,000		X	
New London	31,000	X			New Milford	6,800		X	
Middletown	29,800	X			Portland	6,700		X	
Torrington	29,600	X			Newtown	6,600		X	
Groton	26,600	X			Griswold	6,600	X		
Wallingford	23,500	X			Wilton	6,400		X	
Enfield	19,700	X			E. Windsor	6,300			X
Naugatuck	19,200	X			Simsbury	6,200			X
Ansonia	18,900		X		Thompson	6,100		X	
Windham	17,500	X			Bethel	6,100		X	
E. Haven	16,400		X		Guilford	6,000		X	
Westport	15,900	X			Suffield	5,800		X	
Southington	15,700			X	Litchfield	5,700		X	
Wethersfield	15,500	X			Thomaston	5,600		X	
Windsor	15,400	X			Montville	5,400		X	
Stonington	15,100	X			Coventry	5,400		X	
Shelton	15,000			X	Orange	5,300		X	
Darien	14,900		X		Ridgefield	5,200		X	
Vernon	14,700		X		S. Windsor	5,100			X
Waterford	13,600			X	Cromwell	5,100			X
Branford	13,300		X		E. Hampton	4,800			X
Trumbull	12,900		X		Rocky Hill	4,800	X		

TABLE 27 (CONT'D.)--SURVEY COVERAGE BY INTERVIEW AND QUESTIONNAIRE

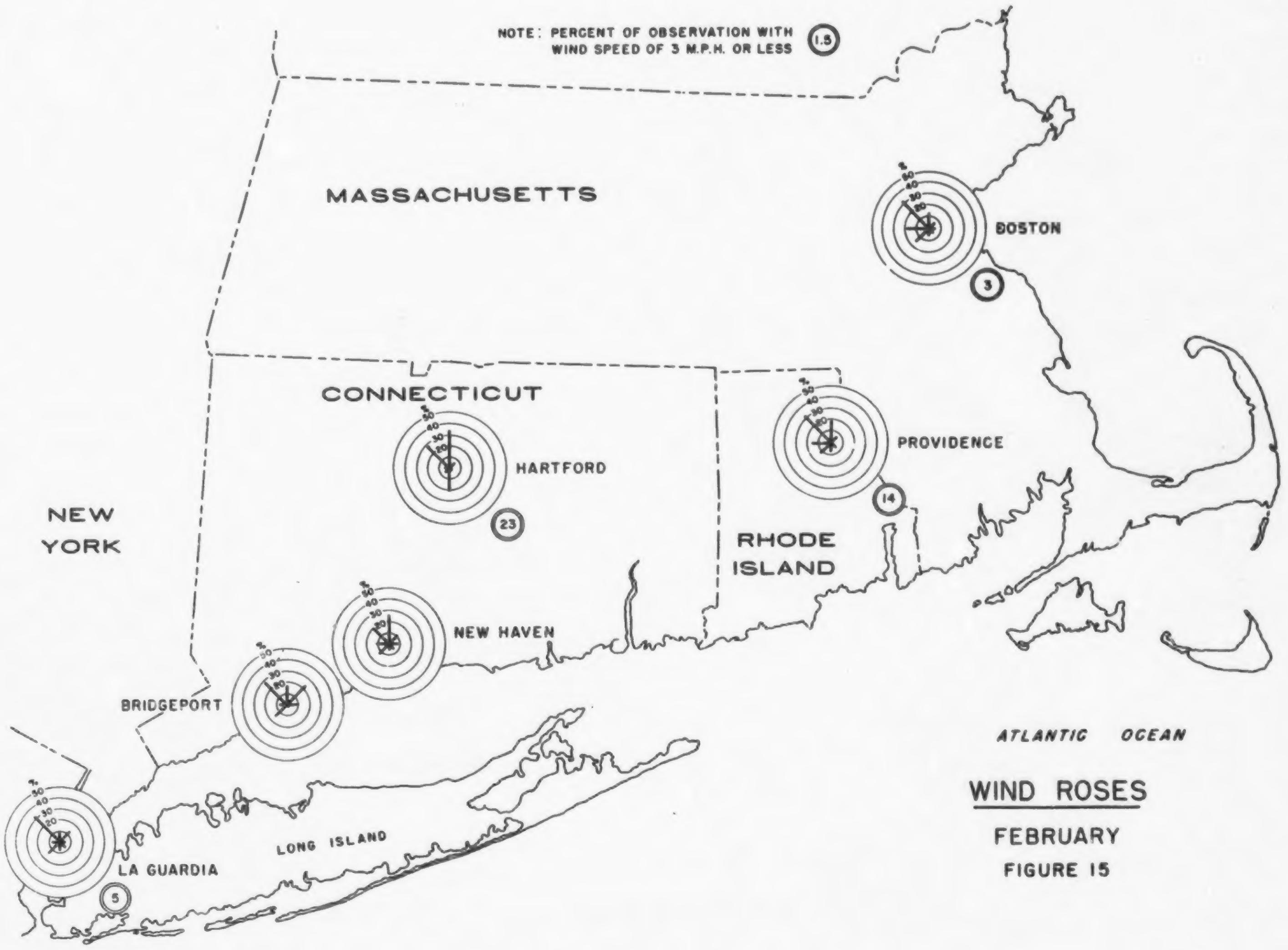
City or town	Population	Visited	Questionnaire	Did not answer questionnaire	City or town	Population	Visited	Questionnaire	Did not answer questionnaire
Wolcott	4,800		X		Durham	2,100		X	
E. Lyme	4,300			X	Sharon	2,100		X	
Avon	4,100		X		Tolland	2,100		X	
Canton	4,100		X		Lebanon	2,000			X
Middlebury	3,900		X		Bolton	1,800			X
Monroe	3,900		X		Norfolk	1,800		X	
Ellington	3,800			X	E. Granby	1,700			X
Essex	3,800		X		Willington	1,700		X	
Madison	3,700		X		Bethany	1,600		X	
Colchester	3,600		X		Columbia	1,600		X	
Woodbridge	3,600			X	Hebron	1,600		X	
Granby	3,500			X	Lisbon	1,600		X	
Old Saybrook	3,400		X		New Fairfield	1,600		X	
Weston	3,200			X	N. Stonington	1,600		X	
Brooklyn	3,100			X	Bozrah	1,500			X
E. Haddam	3,100		X		Canterbury	1,500			X
Haddam	3,100		X		Kent	1,500			X
Oxford	3,100			X	Sterling	1,500			X
Salisbury	3,100			X	Andover	1,400		X	
Somers	3,100		X		Bethlehem	1,300		X	
Clinton	3,000		X		Marlborough	1,300			X
Deep River	3,000		X		Goshen	1,200		X	
Old Lyme	3,000		X		Barkhamsted	1,100			X
New Hartford	2,900			X	Cornwall	1,100		X	
Southbury	2,900		X		Voluntown	1,000			X
Woodbury	2,900		X		Ashford	990		X	
Easton	2,800		X		Franklin	960			X
N. Canaan	2,700		X		Chaplin	920		X	
N. Branford	2,600			X	Lyme	920		X	
Prospect	2,600		X		Morris	890		X	
Middlefield	2,500			X	Hampton	850		X	
Sprague	2,500		X		Canaan	840			X
Woodstock	2,500			X	Bridgewater	830			X
Ledyard	2,400		X		Killingworth	830			X
Washington	2,400		X		Roxbury	770			X
Brookfield	2,300			X	Salem	770		X	
Burlington	2,300			X	Hartland	760			X
Harwinton	2,300			X	Eastford	690		X	
Pomfret	2,300		X		Scotland	630		X	
Preston	2,300		X		Sherman	630			X
Redding	2,300			X	Colebrook	620			X
Beacon Falls	2,200			X	Warren	510		X	
Chester	2,200		X		Union	290		X	
Westbrook	2,200		X						
					Total		35	81	53


NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS
1.5
MASSACHUSETTS
BOSTON
CONNECTICUT
HARTFORD
28
PROVIDENCE
17
RHODE ISLAND
NEW YORK
NEW HAVEN
BRIDGEPORT
LA GUARDIA
7
LONG ISLAND
%
50
40
30
20
ATLANTIC OCEAN

WIND ROSES

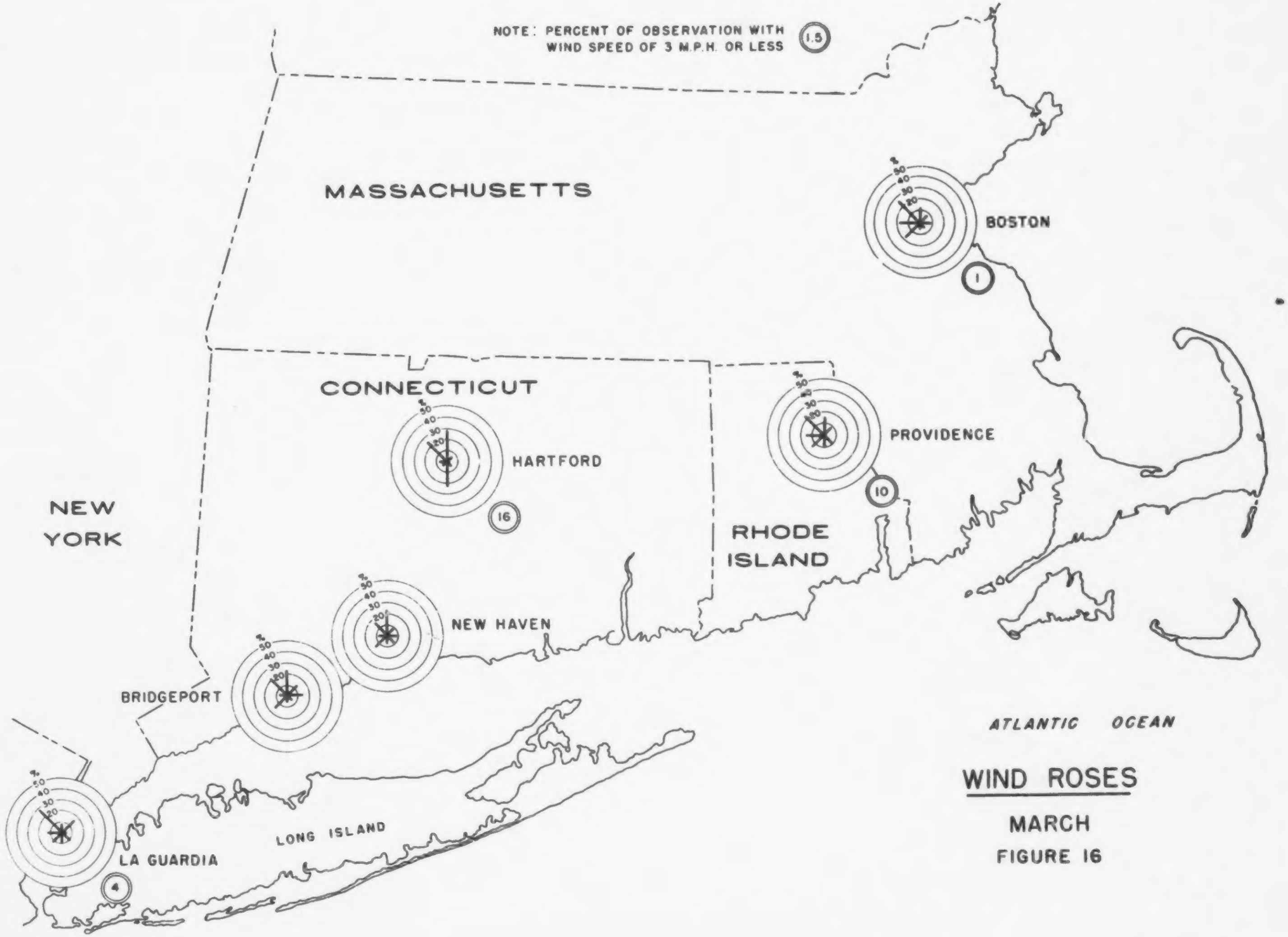
JANUARY

FIGURE 14


MASSACHUSETTS
CONNECTICUT
NEW YORK
RHODE ISLAND
BOSTON
3
PROVIDENCE
14
HARTFORD
23
NEW HAVEN
BRIDGEPORT
LA GUARDIA
5
LONG ISLAND
ATLANTIC OCEAN
%
50
40
30
20

NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS (1.5)

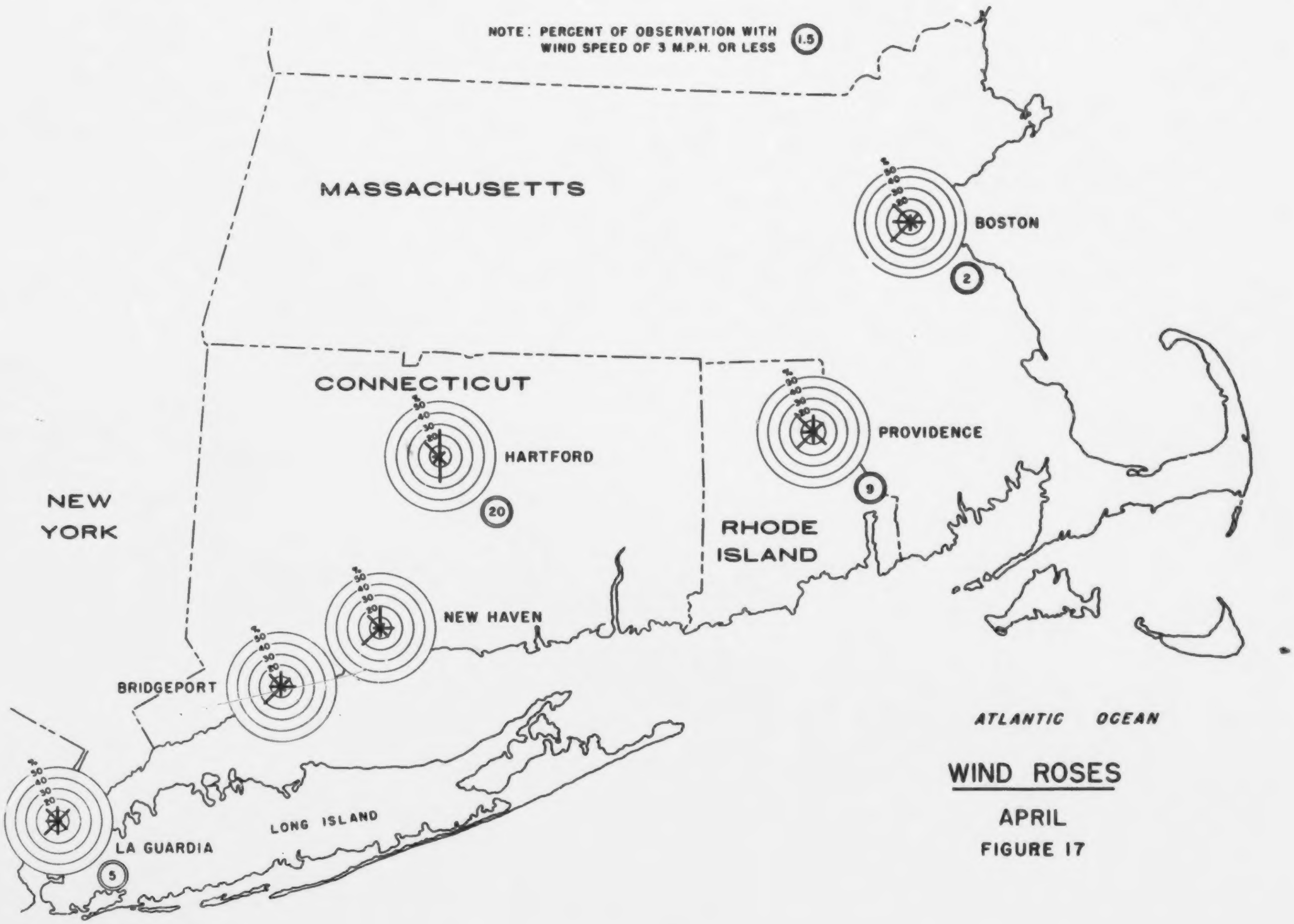
WIND ROSES
FEBRUARY
FIGURE 15


NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS
1.5
MASSACHUSETTS
BOSTON
1
CONNECTICUT
HARTFORD
16
PROVIDENCE
10
RHODE ISLAND
NEW YORK
NEW HAVEN
BRIDGEPORT
LA GUARDIA
4
LONG ISLAND
ATLANTIC OCEAN
%
50
40
30
20

WIND ROSES

MARCH

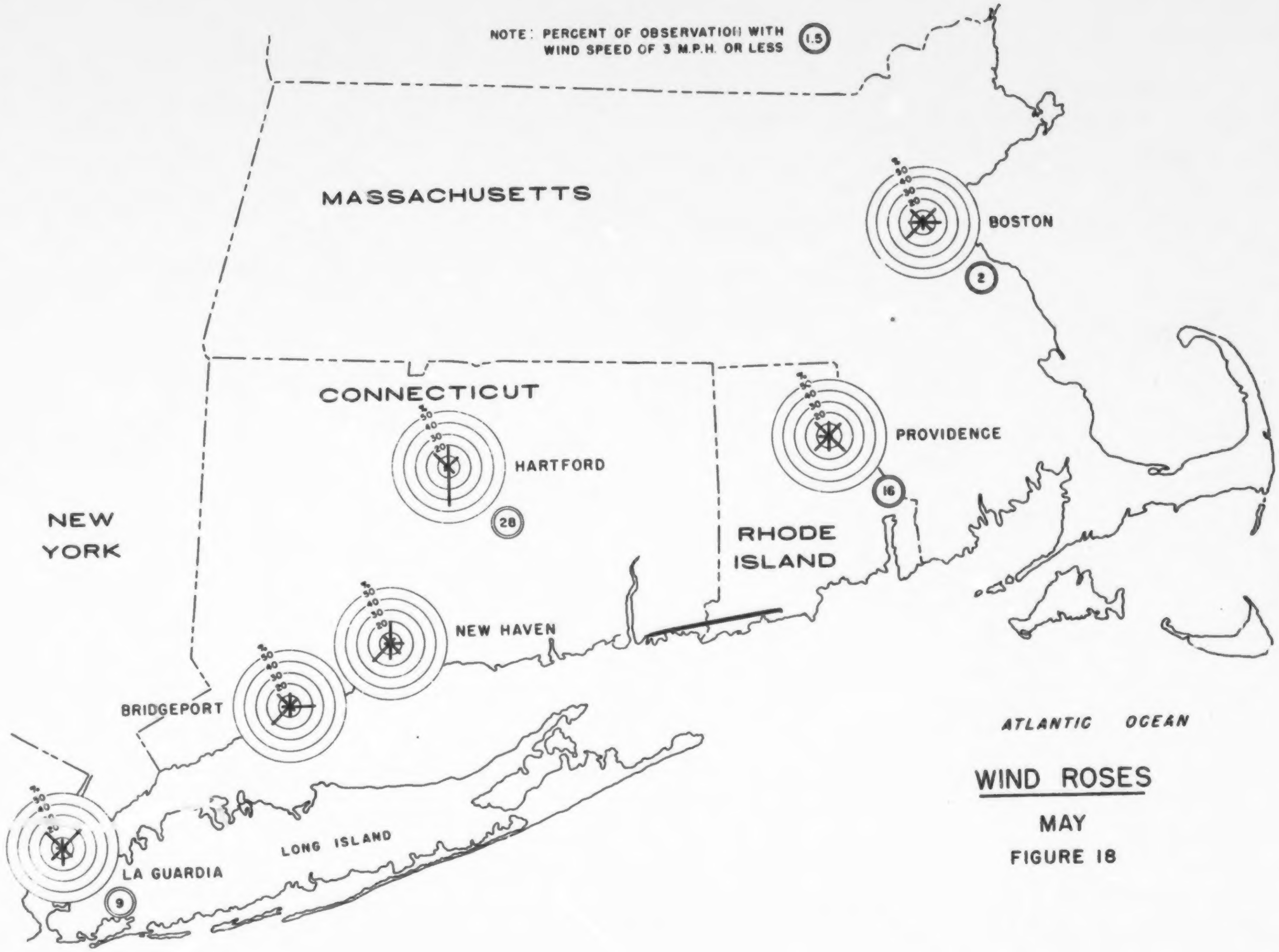
FIGURE 16


NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS
1.5
MASSACHUSETTS
BOSTON
2
CONNECTICUT
HARTFORD
20
PROVIDENCE
9
NEW YORK
RHODE ISLAND
NEW HAVEN
BRIDGEPORT
LA GUARDIA
5
LONG ISLAND
ATLANTIC OCEAN
%
50
40
30
20

WIND ROSES

APRIL

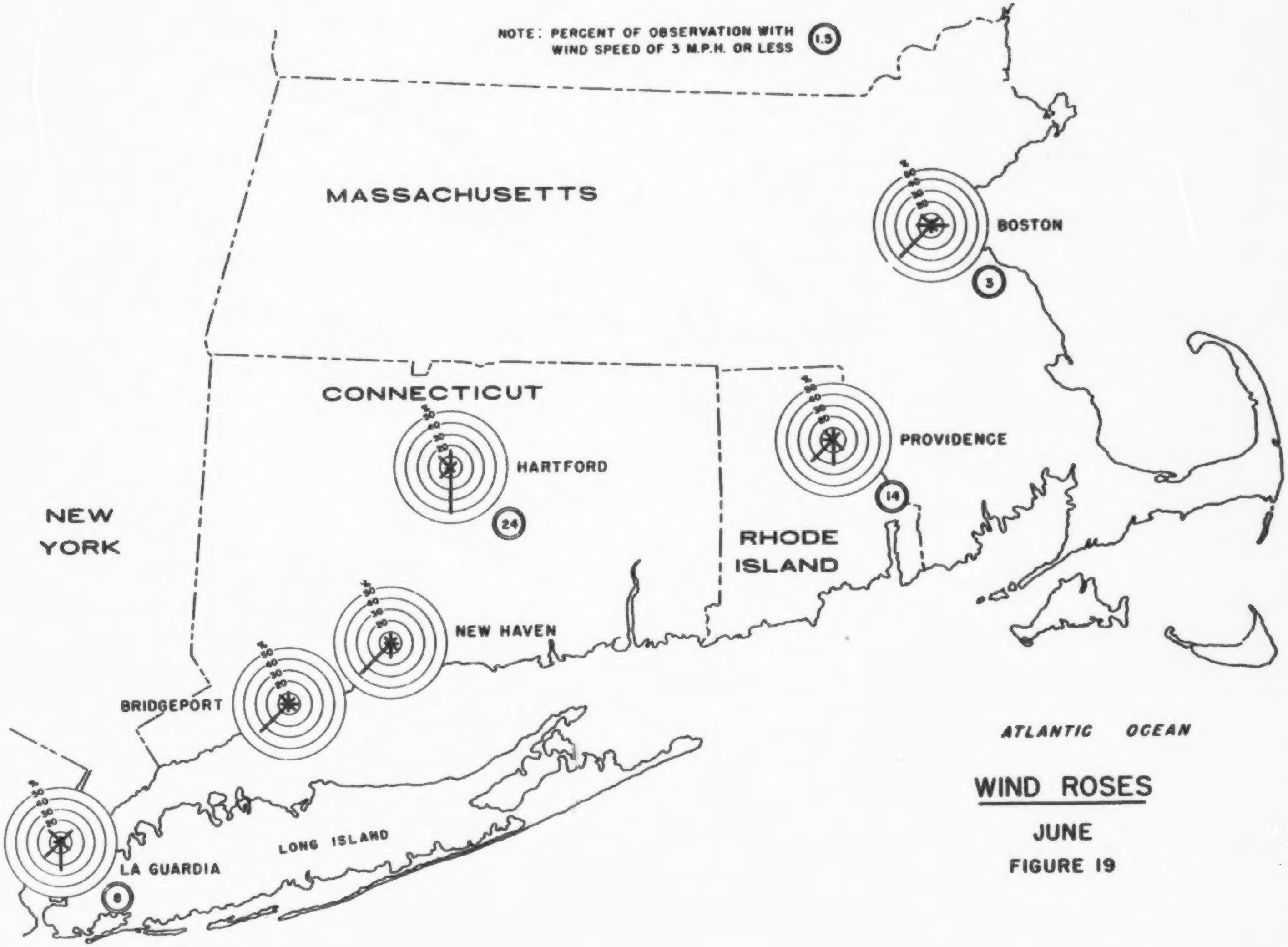
FIGURE 17


NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS
1.5
MASSACHUSETTS
CONNECTICUT
NEW YORK
RHODE ISLAND
BOSTON
2
PROVIDENCE
16
HARTFORD
28
NEW HAVEN
BRIDGEPORT
LA GUARDIA
9
LONG ISLAND
ATLANTIC OCEAN
%
50
40
30
20

WIND ROSES

MAY

FIGURE 18

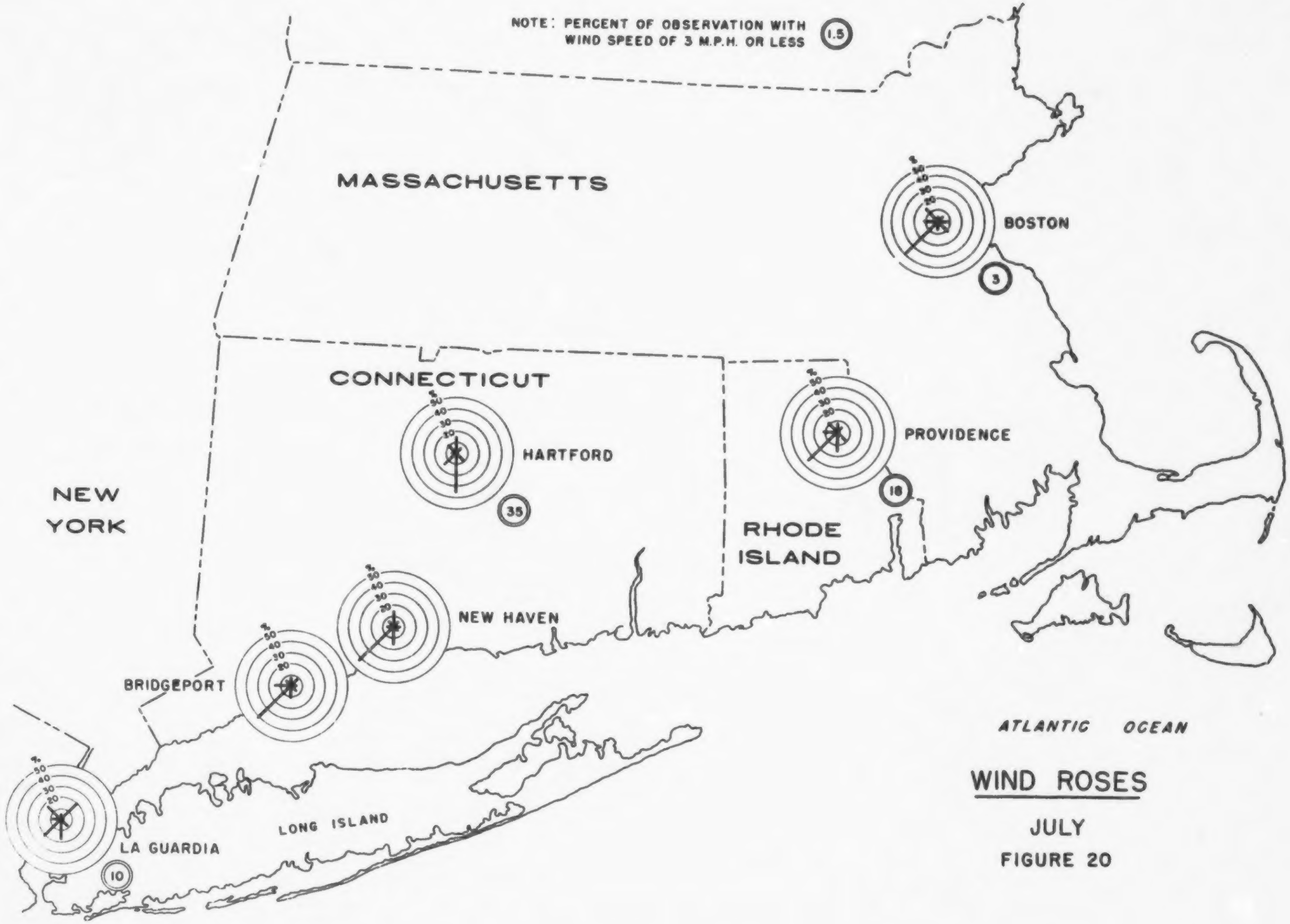

MASSACHUSETTS
CONNECTICUT
RHODE ISLAND
NEW YORK
BOSTON
3
PROVIDENCE
14
HARTFORD
24
NEW HAVEN
BRIDGEPORT
LA GUARDIA
8
LONG ISLAND
ATLANTIC OCEAN
%
50
40
30
20

NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS (1.5)

WIND ROSES

JUNE

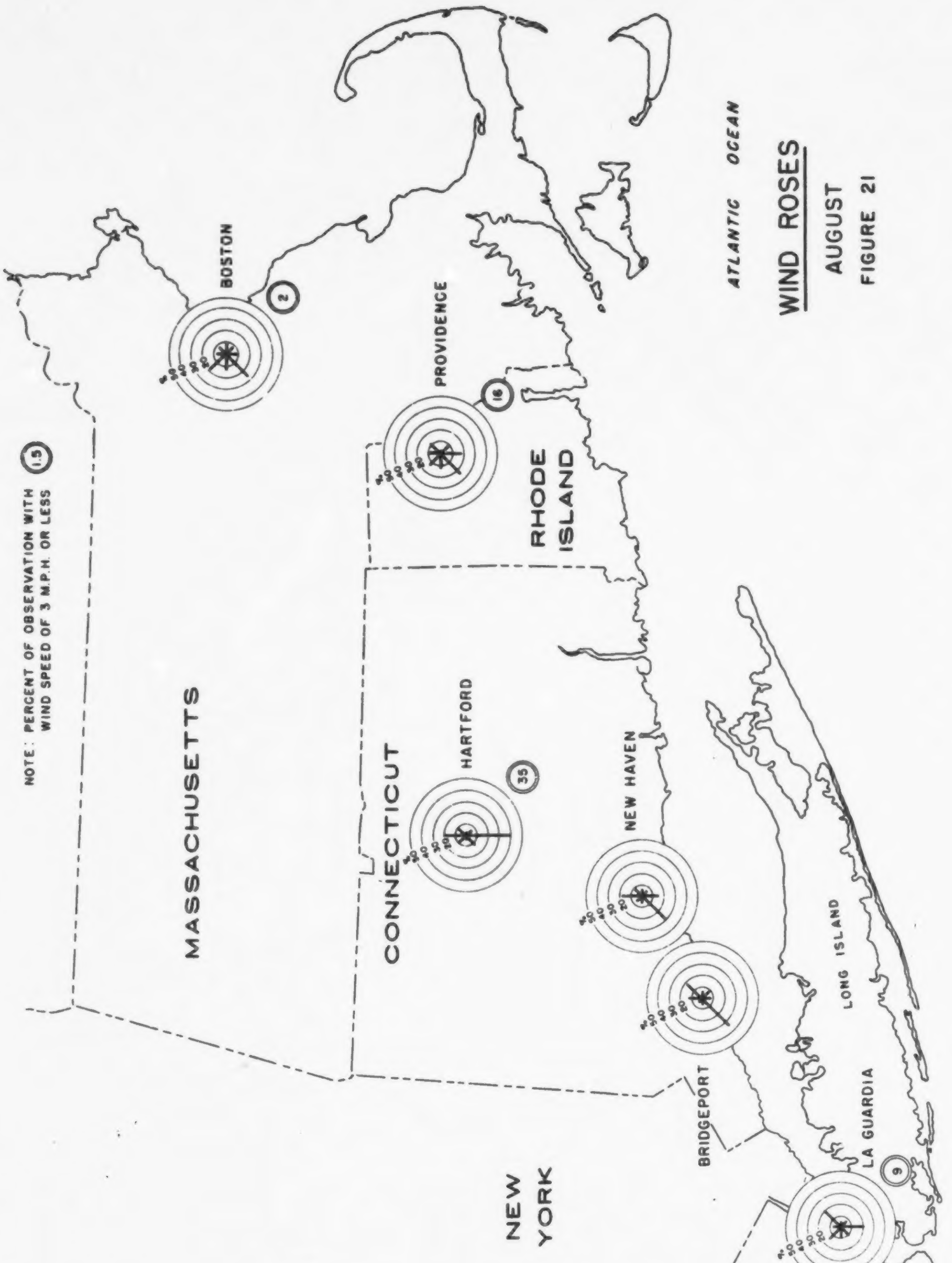
FIGURE 19


NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS
1.5
MASSACHUSETTS
BOSTON
3
CONNECTICUT
HARTFORD
35
PROVIDENCE
18
NEW YORK
RHODE ISLAND
NEW HAVEN
BRIDGEPORT
LA GUARDIA
10
LONG ISLAND
ATLANTIC OCEAN
%
50
40
30
20
10

WIND ROSES

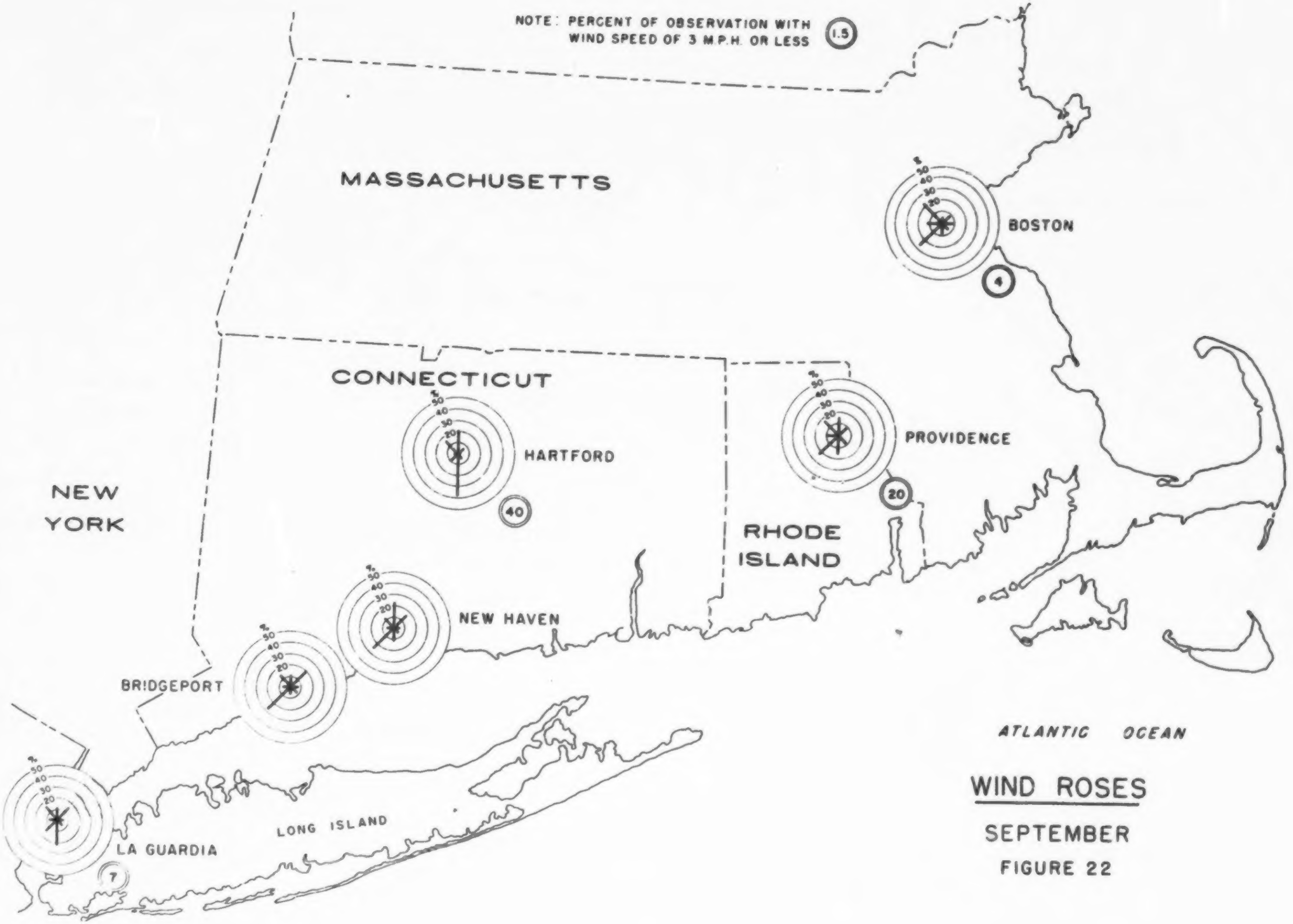
JULY

FIGURE 20


MASSACHUSETTS
CONNECTICUT
RHODE ISLAND
NEW YORK
BOSTON
2
PROVIDENCE
16
HARTFORD
35
NEW HAVEN
BRIDGEPORT
LA GUARDIA
9
LONG ISLAND
ATLANTIC OCEAN
10
20
30
40
50

NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS (1.5)

WIND ROSES
AUGUST
FIGURE 21

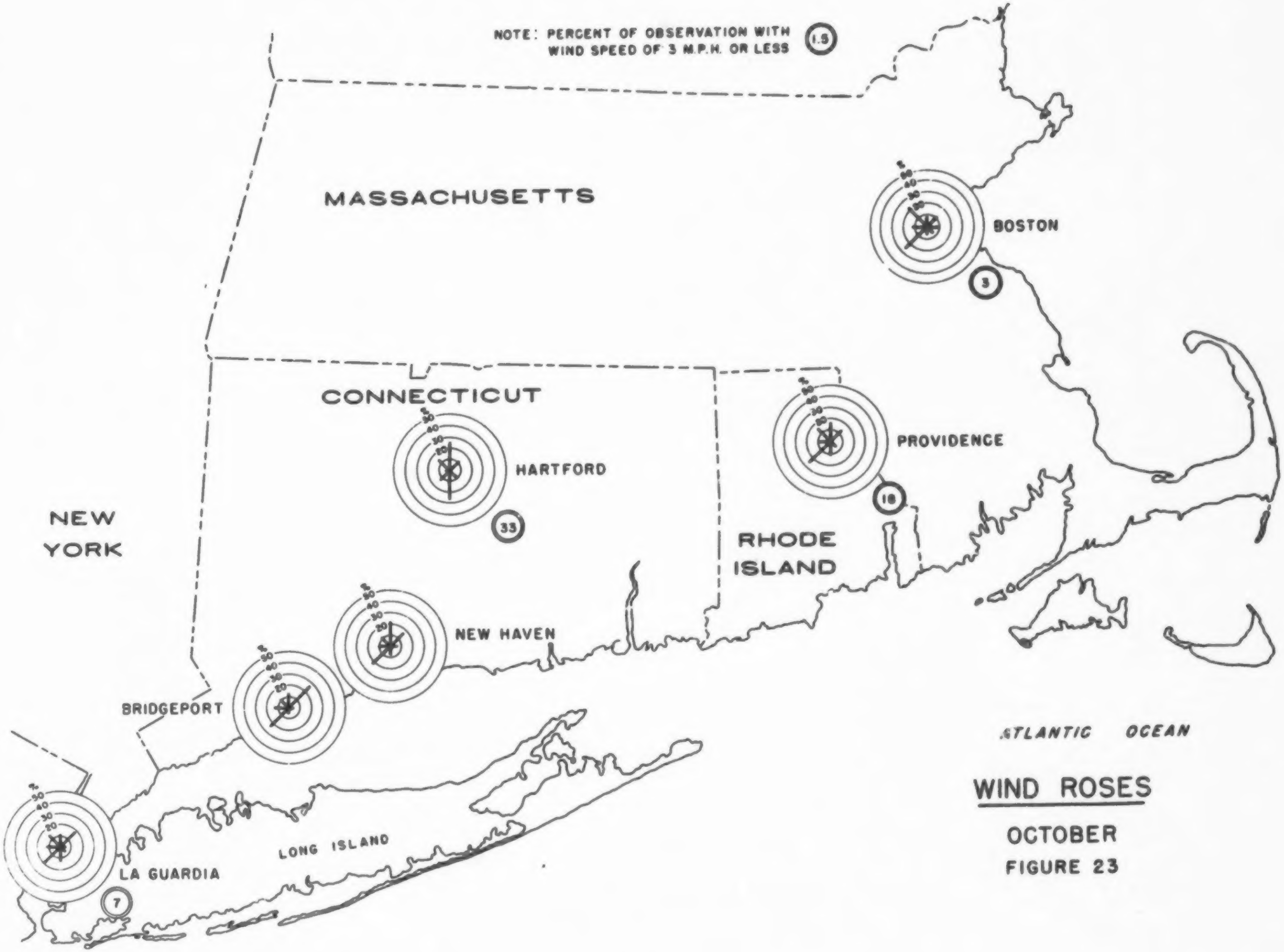

MASSACHUSETTS
CONNECTICUT
NEW YORK
RHODE ISLAND
BOSTON
4
PROVIDENCE
20
HARTFORD
40
NEW HAVEN
BRIDGEPORT
LA GUARDIA
7
LONG ISLAND
ATLANTIC OCEAN
%
50
40
30
20

NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS (1.5)

WIND ROSES

SEPTEMBER

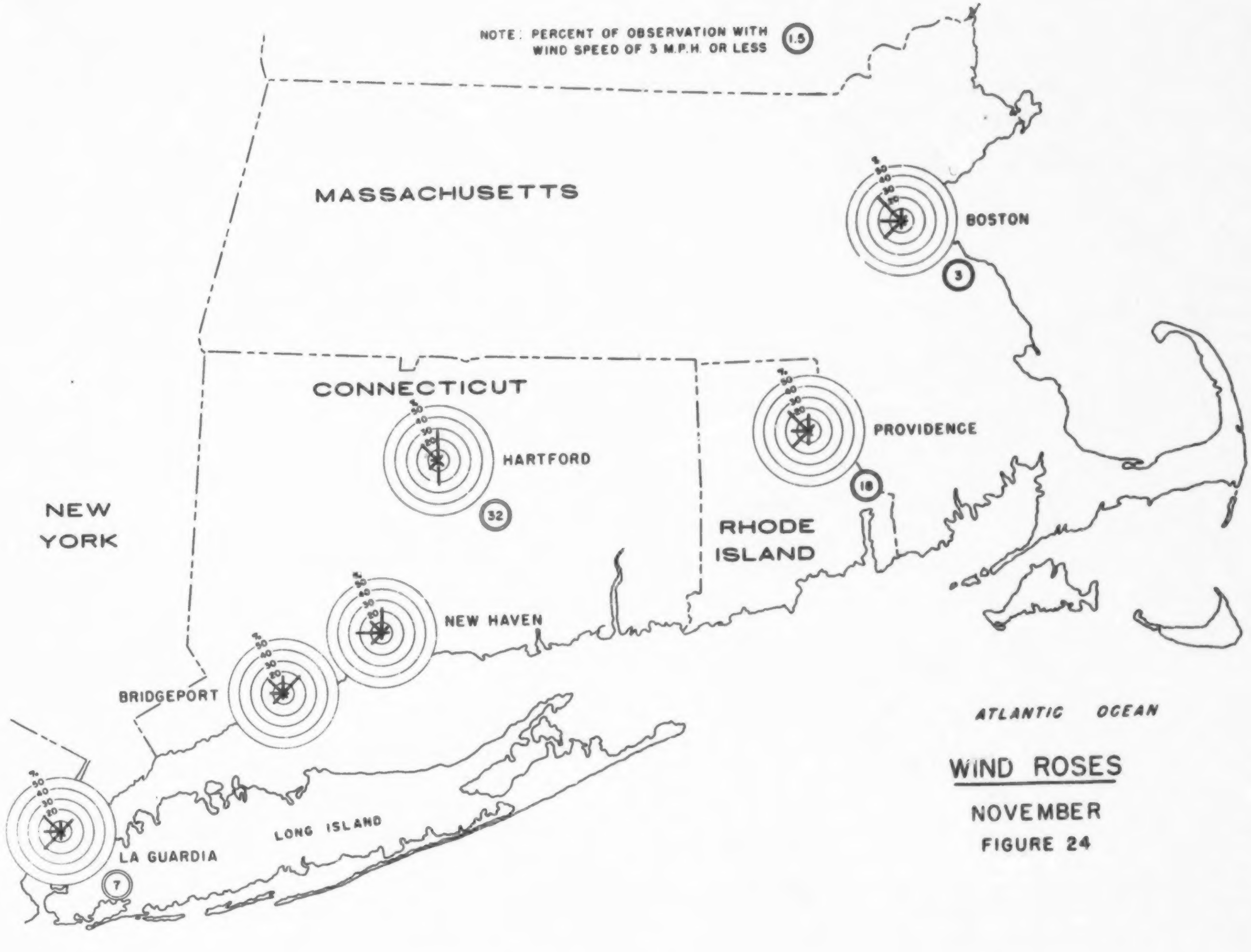
FIGURE 22


NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS
1.5
MASSACHUSETTS
BOSTON
3
CONNECTICUT
HARTFORD
33
PROVIDENCE
18
RHODE ISLAND
NEW YORK
NEW HAVEN
BRIDGEPORT
LA GUARDIA
7
LONG ISLAND
ATLANTIC OCEAN
%
50
40
30
20

WIND ROSES

OCTOBER

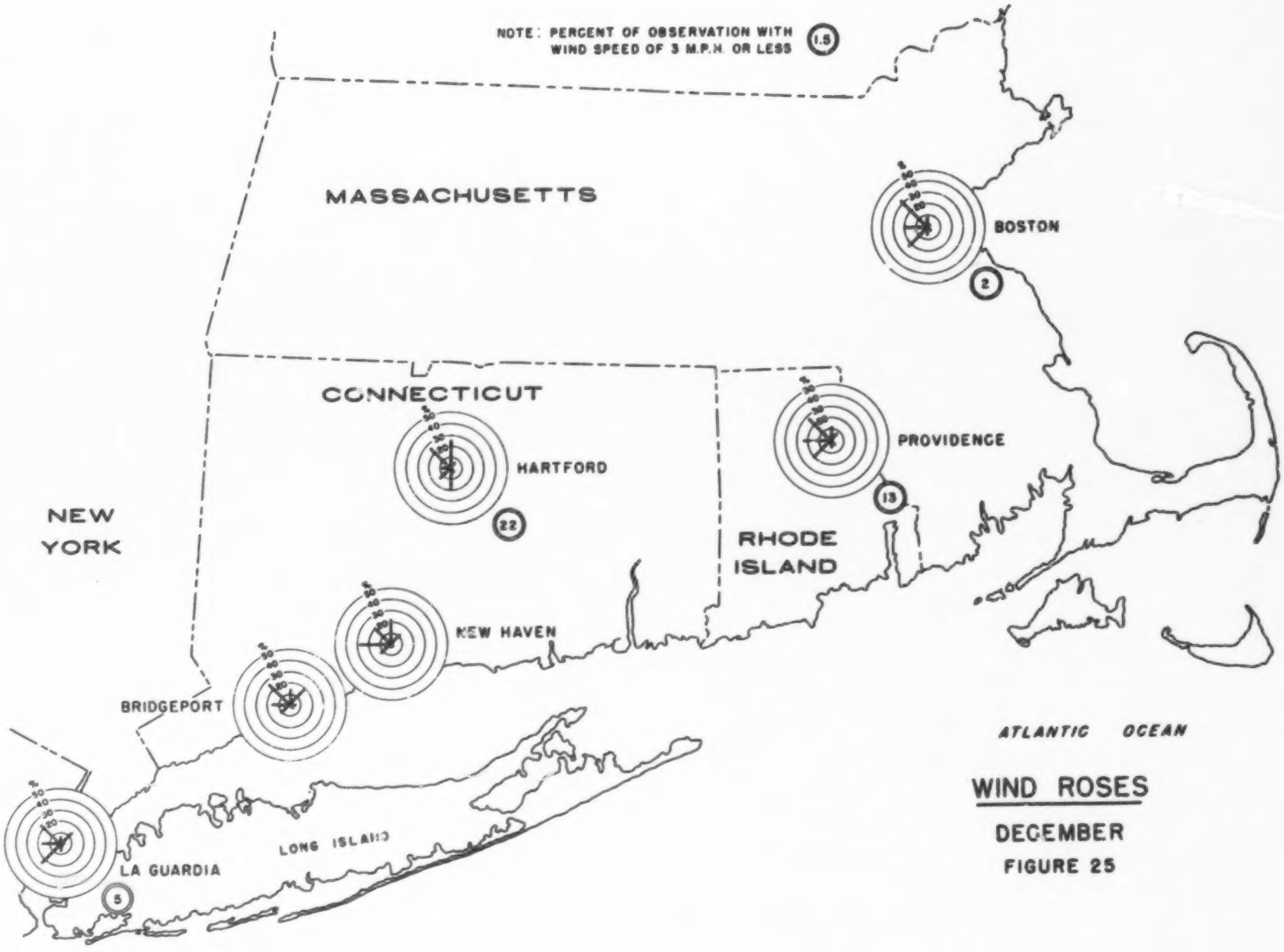
FIGURE 23


NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS
1.5
MASSACHUSETTS
BOSTON
3
CONNECTICUT
HARTFORD
32
PROVIDENCE
18
RHODE ISLAND
NEW YORK
NEW HAVEN
BRIDGEPORT
LA GUARDIA
7
LONG ISLAND
ATLANTIC OCEAN
%
50
40
30
20

WIND ROSES

NOVEMBER

FIGURE 24


NOTE: PERCENT OF OBSERVATION WITH WIND SPEED OF 3 M.P.H. OR LESS (1.5)
MASSACHUSETTS
BOSTON
2
CONNECTICUT
HARTFORD
22
PROVIDENCE
13
RHODE ISLAND
NEW YORK
NEW HAVEN
BRIDGEPORT
LA GUARDIA
5
LONG ISLAND
ATLANTIC OCEAN
%
50
40
30
20
10

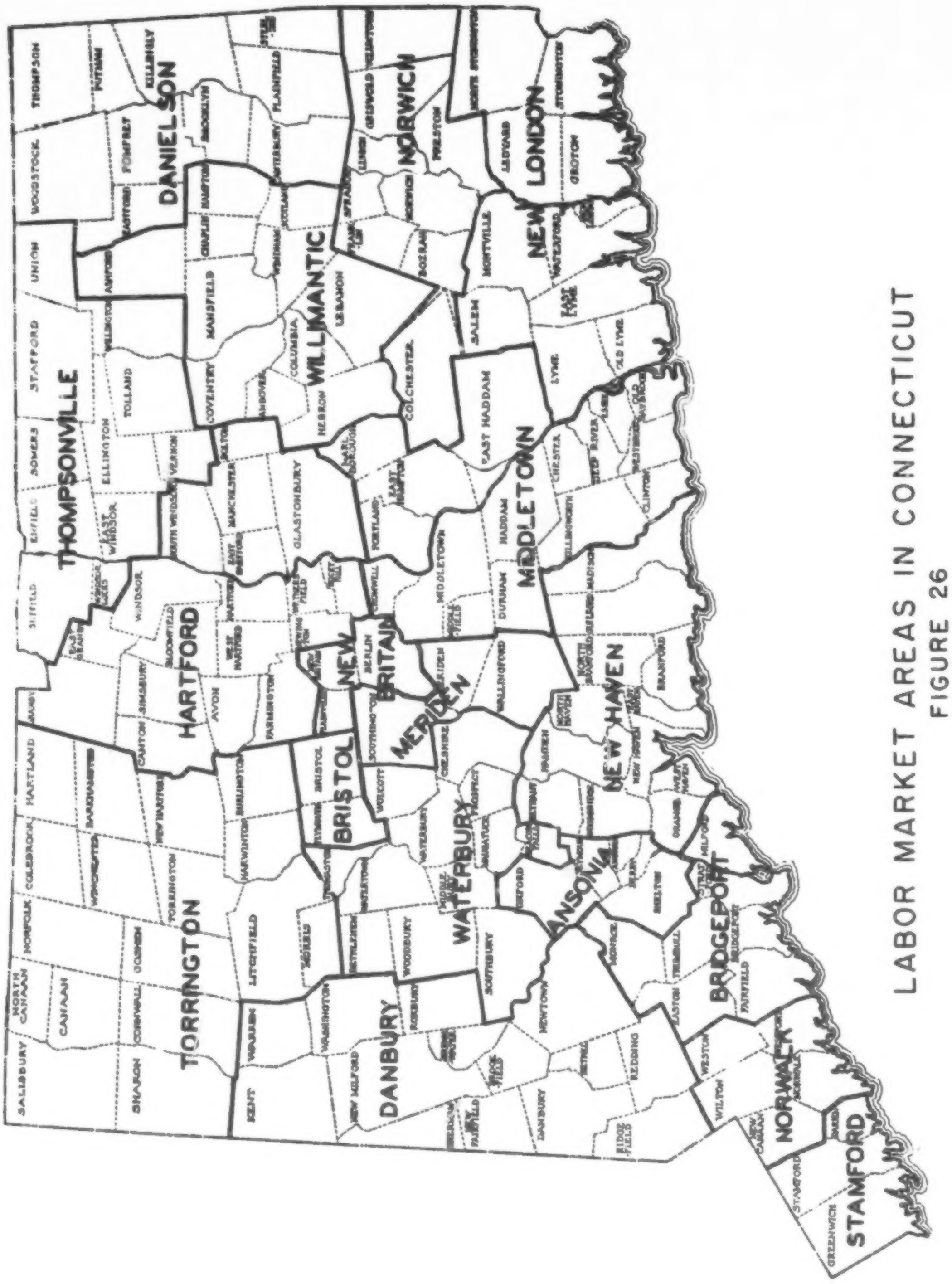
WIND ROSES

DECEMBER

FIGURE 25

APPENDIX E

NUMBER OF EMPLOYEES IN VARIOUS INDUSTRIES BY LABOR AREAS


THOMPSONVILLE
DANIELSON
NORWICH
NEW LONDON
WILLIMANTIC
HARTFORD
MIDDLETOWN
NEW BRITAIN
MERIDEN
BRISTOL
NEW HAVEN
TORRINGTON
WATERBURY
ANSONIA
DANBURY
BRIDGEPORT
NORWALK
STAMFORD
THOMPSON
WOODSTOCK
UNION
STAFFORD
SOMERS
ENFIELD
SUFFIELD
GRANBY
HARTLAND
COLEBROOK
NORFOLK
NORTH CANAAN
SALISBURY
CANAAN
SHARON
CORNWALL
GOSHEN
KENT
WARREN
LITCHFIELD
NEW MILFORD
WASHINGTON
WOODBURY
SOUTHBURY
NEWTOWN
DANBURY
REDDING
BETHEL
RIDGEFIELD
WILTON
WESTON
EASTON
TRUMBULL
FAIRFIELD
SHELTON
GREENWICH
STAMFORD
NEW CANAAN
ELLINGTON
TOLLAND
MANSFIELD
COVENTRY
COLUMBIA
LEBANON
HEBRON
COLCHESTER
SALEM
EAST HADDAM
LYME
OLD LYME
MONTVILLE
GROTON
STONINGTON
LEDYARD
GLASTONBURY
MANCHESTER
WINDSOR
BLOOMFIELD
SIMSBURY
CANTON
AVON
FARMINGTON
BURLINGTON
HARWINTON
TORRINGTON
NEW HARTFORD
BARKHAMSTED
WINCHESTER
MIDDLETOWN
DURHAM
HADDAM
WALLINGFORD
CHESHIRE
BRANFORD
MADISON
CLINTON
CHESTER
KILLINGWORTH
PORTLAND
POMFRET
PLAINFIELD
KILLINGLY
PUTNAM
BROOKLYN

LABOR MARKET AREAS IN CONNECTICUT
FIGURE 26

83-B

TABLE 28--NUMBER OF EMPLOYEES IN VARIOUS INDUSTRIES FOR DECEMBER 1955 OR FEBRUARY 1956, BY LABOR AREAS[15] (SEE FIGURE 26)

LABOR AREA	ANSONIA	BRIDGEPORT	BRISTOL	DANBURY	DANIELSON	HARTFORD	MERIDEN	MIDDLETOWN	NEW BRITAIN
Total Nonagriculture	18,470	120,840	17,720	22,400	11,710	198,520	34,770	22,390	44,920
Nonmanufacturing	5,840	48,840	5,030	12,000	5,050	121,790	12,460	11,740	15,590
Construction	480	4,630	490	1,450	240	8,010	1,560	890	1,200
Transportation	260	3,320	070	730	380	4,550	590	170	820
Communications and utilities	300	2,340	200	500	W/A	3.250	430	540	1,210
Trade	2,120	18,650	2,000	4,210	1,710	39,970	4,400	3,860	6,120
Finance, insurance and real estate	230	2,630	240	560	130	27,550	630	460	680
Service	1,100	9,480	930	1,990	1,100	20,500	2,530	2,510	2,790
Government	1,350	7,790	1,100	2,560	1,490	17,960	2,320	3,310	2,770
Manufacturing	12,630	72,000	12,690	10,400	6,660	76,730	22,310	10,650	29,330
Ordnance	-	3,280	-	-	-	-	-	-	-
Food	-	1,450	-	-	-	2,350	-	-	280
Textile	710	750	-	750	2,640	820	370	1,070	-
Apparel	410	4,170	-	W/A	-	1,380	-	430	730
Lumber and furniture	-	-	-	-	740	940	-	-	-
Paper, printing and publishing	-	1,090	580	-	380	3,300	560	660	-
Chemical	-	1,020	-	-	-	1,330	850	1,530	-
Rubber	3,140	890	-	-	-	W/A	-	W/A	-
Leather	-	-	-	-	-	-	-	-	-
Primary metals	2,540	6,560	570	550	-	1,330	1,180	-	3,160
Fabricated metals	1,730	7,640	3,030	650	-	36,540	2,450	1,400	W/A
Machinery	2,090	13,860	4,620	1,460	-	20,200	4,030	970	2,870
Elec. equipment	870	9,400	700	660	330	3,610	1,660	1,390	5,210
Transportation equip.	-	14,590	-	-	-	-	3,730	W/A	-
Instruments and clocks	-	2,400	2,850	1,610	-	2,120	-	-	-
Stone, clay and glass	-	1,710	-	-	-	-	-	-	-
Special products									
Hats	-	-	-	2,970	-	-	-	-	-
Silverware	-	-	-	-	-	-	6,110	-	-
Toys	-	-	-	-	-	-	-	-	-
Brass mills	-	-	-	-	-	-	-	-	-
Metal foundries	-	-	-	-	-	-	-	-	-
Other metallic	-	-	-	-	1,090	-	-	-	14,690
Other nonmetallic	-	-	-	-	1,490	-	-	-	-
Other mfg.	1,140	3,190	340	1,750	-	2,810	1,370	3,200	2,130

TABLE 28 (CONT'D.)--NUMBER OF EMPLOYEES IN VARIOUS INDUSTRIES FOR DECEMBER 1955 OR FEBRUARY 1956, BY LABOR AREAS[15] (SEE FIGURE 26)

LABOR AREA	NEW HAVEN	NEW LONDON	NORWALK	NORWICH	STAMFORD	THOMPSONVILLE	TORRINGTON	WATERBURY	WILLIMANTIC
Total Nonagriculture	119,640	30,410	27,870	19,660	50,080	22,510	21,130	68,900	12,440
Nonmanufacturing	73,190	16,370	14,640	10,660	30,400	7,720	9,650	24,950	6,860
Construction	5,570	1,720	2,040	520	3,760	600	1,420	1,810	310
Transportation	7,370	1,160	520	430	1,340	550	380	1,530	430
Communications and utilities	4,780	610	570	170	1,470	290	540	1,170	W/A
Trade	23.080	4,830	4,990	4,350	10,820	2,640	3,050	9,710	1,700
Finance, insurance and real estate	6,340	390	790	390	1,830	270	470	1,370	140
Service	17,040	3,460	3,660	1,620	7,310	1,590	1,870	4,390	640
Government	9,060	4,200	2,070	3,180	3,870	1,780	1,920	4,970	3,640
Manufacturing	46,450	14,040	13,230	9,000	19,680	14,780	11,480	43,950	5,580
Ordnance	5,810	-	-	-	-	-	-	-	-
Food	2,290	-	680	-	-	-	-	920	-
Textile	640	1,360	2,220	4,760	1,180	5,490	380	-	2,140
Apparel	5,800	550	1,080	540	W/A	-	-	1,060	-
Lumber and furniture	-	-	-	-	-	-	-	-	-
Paper, printing and publishing	4,510	1,210	570	700	2,810	550	-	670	-
Chemical	670	1,370	340	-	1,860	-	-	7,970	-
Rubber	2,870	-	-	-	-	-	-	W/A	-
Leather	-	-	990	850	-	-	-	-	-
Primary metals	5,470	-	-	-	720	-	1,740	-	-
Fabricated metals	4,160	1,350	1,010	940	1,820	-	-	10,200	-
Machinery	2,620	960	1,620	-	6,090	-	3,410	2,840	-
Elec. equipment	2,490	-	2,200	-	2,880	-	1,550	-	-
Transportation equip.	4,450	5,330	-	-	-	-	-	-	-
Instruments and clocks	1,120	-	620	-	-	-	-	5,230	-
Stone, clay and glass	730	-		-	-	-	500	-	-
Special products									
Hats	-	-	-	-	-	-	-	-	-
Silverware	-	-	-	-	-	-	-	-	-
Toys	1,570	-	-	-	-	-	-	-	-
Brass mills	-	-	-	-	-	-	-	8,310	-
Metal foundries	-	-	-	-	-	-	-	650	-
Other metallic	-	-	-	-	-	8,150	-	-	3,160
Other nonmetallic	-	-	-	-	-	600	-	-	2,420
Other mfg.	1,250	1,910	1,900	1,210	2,320	-	1,550	6,120	-

APPENDIX F

COLLECTION OF STATE AND LOCAL LEGISLATION RELATING TO AIR POLLUTION

COLLECTION OF STATE AND LOCAL ORDINANCES

RELATING TO AIR POLLUTION

PROVISIONS OF STATE SANITARY CODE RELATED TO PREVENTION OR CONTROL OF AIR POLLUTION

Garbage and Refuse

Reg. 104 (a) The owner of premises upon which persons reside or which are frequented for pleasure or business shall keep such premises free from accumulations of garbage, rubbish, rags, tin cans, paper, empty barrels, boxes or any material which because of its character, condition or improper storage may invite the breeding or collection of flies, mosquitoes or rodents, or which may in any other manner prejudice the public health.

(b) In populous districts stable manure must be kept in a covered watertight pit or chamber and shall be removed at least once a week during the period from May first to October first and during the other months at intervals sufficiently frequent to maintain a sanitary condition satisfactory to the director of health. Manure on farms or isolated premises other than dairy farms need not be so protected and removed unless ordered by the director of health.

Manufacturing and Other Wastes

Reg. 105 No materials or waste products from any mill, factory, slaughterhouse, rendering or fertilizing works, junk establishment, common carrier, or other industry or utility, shall be stored or deposited so as to cause the surrounding atmosphere, land or water to be contaminated or polluted in such a manner as to injure the public health or create offensive conditions.

Keeping of Animals

Reg. 106 (a) No pigsty shall be built or maintained on marshy ground or land subject to overflow, nor within 300 feet of any inhabited house or public meeting house upon property other than that of the proprietor of the pigsty.

(b) The carcass of any dead animal not killed for food shall be removed and disposed of within twenty-four hours after death by burial, incineration or other method approved by the local director of health.

Public Dumps

Reg. 107 Any person, firm or corporation who uses or permits the use of any land as a public dump, shall provide for the covering or incineration of all animal and vegetable matter deposited thereon, and for the disposition of other waste materials and rubbish in such a manner as not to create offensive odors, breeding places for insects or rodents, dissemination of dust or fires.

State Statute Related to Control of Air Pollution

SECTION 8217 OF THE GENERAL STATUTES OF CONNECTICUT

REVISION OF 1949

Abatement of manufacturer's nuisance. Temporary injunction. If any manufacturer shall so carry on his business, or so expose the material used therein, or refuse produced thereby, as to constitute a nuisance to the public or to individuals, any persons aggrieved thereby may unite in a complaint to the superior court in the country where the nuisance shall exist, for the discontinuance or abatement of such nuisance, making such manufacturer, if known to them, the defendant, otherwise the person in charge of such manufactory; and service on the latter shall be sufficient notice to any defendant living out of this state. Each such complaint shall be heard at the first term or session unless continued for cause, which continuance may be granted upon such conditions and with such provision for relief in the meantime as the court shall order. If upon such hearing, the court shall be of opinion that the plaintiffs are entitled to a decree, it may make such order for the discontinuance or abatement of such nuisance, or for regulating the manner of conducting such business, as it shall find to be necessary; and, if it shall appear that any such order is ineffectual to abate such nuisance or is disobeyed or evaded, such court, at the same or any subsequent term or session, upon such notice as it shall direct, may make such further order and provision for the enforcement of such original order or decree as may be deemed necessary. The superior court, or any judge thereof in vacation, may, upon such complaint, issue a temporary injunction against the continuance of any such nuisance until a final hearing may be had; and, if it shall be impracticable to stay the continuance thereof by a temporary injunction or if such injunction shall be disobeyed or evaded, such court or judge may make and enforce such temporary order for the discontinuance of such nuisance until a final hearing, as may be deemed necessary; but at least twenty-four hours' notice in writing of the time and place of making such motion shall be given to the defendants or some of them, if they are known and can be found in this state, and if not, shall be left with the person in charge of the premises, if such person can be found.

ORDINANCE OF THE CITY OF BRIDGEPORT, 1926

CHAPTER 44--DUST AND SMOKE

SEC. 519 DEFINITIONS: The term "dust" as used in this chapter shall mean all dust, soot, ash, dirt, or other fine particles of matter; the term "dust producing substance" as used herein shall mean all coal, charcoal, coke, sand, gravel, dirt or any other substance composed of, mixed with, producing or otherwise capable of spreading or disseminating dust.

SEC. 520 TRANSPORTATION OF DUST PRODUCING SUBSTANCES: No dust producing substance shall be transported through any street without protection and covering, at all times, sufficient effectually to prevent the spreading or dissemination of dust from such dust producing substance into the air or upon any public or private property. Each violation hereof shall constitute a separate offense.

SEC. 521 PROHIBITION ON DISSEMINATION OF DUST: No person shall so handle, transport, work, load, unload, treat or deal with any dust producing substance in any place in the city, as, by the dissemination of dust, to annoy or disturb unreasonably, or to endanger the health of, any other person or to damage or render unsightly any property or thing.

SEC. 522 PROHIBITION ON DISCHARGE OF SMOKE ETC.: No person shall cause, suffer or allow smoke, fumes or offensive odors to be discharged from any building, vessel, engine, vehicle or other place or premises within the city in such manner, of such quality or in such quantity as to annoy or disturb unreasonably, or to endanger the health of any person or as to damage or render unsightly any property or thing, excepting the discharge of smoke the density of which shall not exceed Diagram Number 3 of the Ringelmann Chart, except for eight minutes in any sixty consecutive minutes and for a period not to exceed twenty consecutive minutes in a period of one day of twenty-four hours, during such time as the fire box is being cleaned or a new fire being built therein.

SEC. 523 PENALTY: All persons participating in or in any way responsible for any violation of the provisions of this ordinance shall be severally guilty of such violation and shall each be fined not more than one hundred dollars.

SEC. 524 PENALTY FOR CONTINUED VIOLATIONS: Any person, firm, or corporation found guilty of any violation of sections 502 or 503 thereof who shall thereafter continue such violation shall be fined not more than one hundred dollars for each day of such continued violation, and the persons responsible for such continued violation shall each be imprisoned for not more than thirty days.

ORDINANCE OF THE CITY OF DANBURY, CONNECTICUT--MAY 1, 1956

Board of Councilmen - Ordinance re Nuisances created by escape of soot, smoke, cinders, noxious acids, fumes, odorous substances or gases, and providing penalties for violation.

Section 1 It shall be unlawful for any person, firm, or corporation to suffer or permit any odor to be produced or to permit or cause the escape of such quantities of soot, smoke, cinders, noxious acids, fumes, odorous substances or gases in such place or manner as to be detrimental to any person or to the public or to endanger the health, comfort, and safety of any person or of the public, or in such manner as to cause or have a contingency to cause injury or damage to property or business. The escape of such matter is declared to be a public nuisance and may be summarily abated by the Health Officer of the City of Danbury, or by anyone whom he may designate for such purpose.

Section 2 Any person, firm, or corporation found violating the provisions of this Ordinance shall be punished by a fine for each offense not exceeding the sum of Two Hundred Fifty Dollars ($250.00) or by imprisonment in jail for a period not exceeding sixty (60) days, or both. Offenses on separate days shall be deemed to be separate offenses for the purposes of this Ordinance. Any abatement hereinbefore provided for shall be in addition to any penalties prescribed in this section.

Adopted by the Board of Councilmen May 1, 1956.

Adopted by the Board of Aldermen May 3, 1956.

Approved by the Mayor May 4, 1956.

AN ORDINANCE CONCERNING SMOKE ABATEMENT--EAST HARTFORD

Section 1 The following ordinance shall be known as the Smoke Abatement Ordinance.

Section 2 Before any person, firm, or corporation shall construct or alter any stationary steam plant, boiler, or furnace within the Town limits of East Hartford, he shall make application at the office of the Building Inspection Department for a permit for that purpose and shall furnish a written statement with plans and specifications in duplicate, giving the style and dimensions of such steam plant, boiler, or furnace, together with the height and size of stack or chimney and the method or device to be adopted for the prevention of the emission of dense smoke therefrom; and if the matters described in said application and statement of plans and specifications be approved by the Building Inspector, he shall issue a permit for the construction or alteration of such steam plant, boiler, or furnance, keeping for the records of his office one set of application papers. The provisions of this section shall not apply to minor necessary or emergency alterations or repairs which do not increase the capacity of said plants or involve any substantial alteration in structure or any alteration in the efficiency or method of smoke prevention.

Section 3 The issuance and the delivery by the Building Inspector of any permit for the construction, reconstruction, alteration, or repair of any plant or chimney connected with a plant shall not exempt any person or corporation from prosecution on account of the emission or issuance of dense smoke caused or permitted by such person or corporation.

Section 4 It shall be the duty of the Director of Public Works or his authorized assistants to investigate all violations and complaints of violations of this ordinance, to collect evidence in regard to the same, and to present such evidence to the prosecuting attorney for his action.

Section 5 For the purpose of grading the density of smoke, the Ringelmann smoke chart, as published and used by the Federal Bureau of Mines, shall be the standard of comparison. Smoke shall be considered "dense" within the meaning of this ordinance when it is equal to or of greater density than No. 3 of said chart.

Section 6 The emission of dense smoke within the Town from the smokestack of any locomotive, steamboat, steam tug, steam roller, steam derrick, steam pile driver, tar kettle, or other similar machine or contrivance or from any open fire or from the smokestack or chimney of any building or premises excepting for a period of six minutes in any one hour during which the fire box is being cleaned out or a new fire built therein is hereby declared to be a nuisance. In cases of emergency, the Director of Public Works shall have authority to issue permits allowing the emission of dense smoke for a period not exceeding one hour.

Section 7 The number of minutes or seconds during which smoke may be emitted in any period as provided in this section shall be deemed to mean the aggregate number of minutes or seconds, and such minutes or seconds need not be consecutive.

Section 8 The Director of Public Works or his authorized assistants may order any nuisance as above specified abated and shall cause said order, before its execution, to be served on the owner or person in charge of the property or thing upon or in connection with which such nuisance exists or such of them as are in the Town and can be found. It shall be the duty of the police of said Town to execute the order of the Director of Public Works when so requested by said Director. If the party served with an order by the Director of Public Works, before the execution of said order is begun, applies to said Director for a modification or stay of such order, it shall be the duty of the Director to suspend temporily or modify it and give the party, as the case may require, a reasonable and fair opportunity to be heard and to present proofs and facts against the execution of the order or in favor of its modification. Abatement of any such nuisance may be in addition to the fine hereinafter provided.

Section 9 Any person or corporation owning, operating, or in charge or control of any locomotive, steam boat, steam tug, steam roller, steam derrick, steam pile driver, tar kettle, or other similar machine or contrivance or of any building or premises who shall cause or permit the emission of dense smoke within the Town in contravention of the provisions of this section, from any smokestack, chimney, or other contrivance used for the emission of smoke shall be deemed guilty of violation of this ordinance and be punished as hereinafter provided.

Section 10 Temporary permits for the emission of dense smoke, covering periods not exceeding six months from the date on which this ordinance shall take effect, may be granted by the Director of Public Works to any person or corporation applying for the same and satisfying the said Director of Public Works that he will make changes or improvements to prevent the emission of dense smoke before the expiration of the period for which such temporary permit is granted. But after six months have elapsed from the time when this ordinance takes effect, no further temporary permits shall be granted unless the Director of Public Works is satisfied that public convenience requires it, and permits so granted shall be for a period not exceeding six months.

Section 11 The provisions of this ordinance shall not apply to buildings used exclusively for private residence purpose in which the number of families occupying apartments shall be less than nine, nor shall the provisions of this ordinance apply to the Town Fire Department.

Section 12 Any violation of the provisions of this ordinance shall be a misdemeanor and shall be punished by a fine of not more than fifty dollars for the first offense and not more than one hundred dollars for each succeeding offense. The prosecution or maintenance of any alteration or construction without a permit as provided in Section 2 hereof shall be considered a single and separate offense each day of such prosecution or maintenance, and each and every violation of this ordinance in any other respect shall constitute a separate offense.

This ordinance shall take effect fifteen days after passage by the Town Council.

HARTFORD CITY CODE--SMOKE ABATEMENT

CHAPTER 34

Section 34-1 Scope of chapter.

The provisions of this chapter shall not apply to buildings used exclusively as private residence in which the number of families occupying apartments is less than nine, nor shall they apply to the fire department. (1945, 11-52, (j).)

Section 34-2 Failure to comply with chapter.

It shall be unlawful for any person owning, operating or in charge or control of any locomotive, steamboat, steam tug, steam roller, steam derrick, steam pile driver, tar kettle or other similar structure or device, or of any building or premises, to cause or permit the emission of dense smoke or soot in the city, in contravention of the provisions of this chapter, from any smokestack, chimney or other device used for the emission of smoke or soot. (1945, 11-52, (f).)

Section 34-3 Duties of chief inspector of licenses and inspections.

It shall be the duty of the chief inspector of licenses and inspections to investigate all violations and complaints of violations of this chapter; to collect evidence in regard to the same, and to present such evidence to the prosecuting attorney for his action. (1945, 11-52, (a).)

Section 34-4 Emission of dense smoke declared a nuisance; exceptions.

(a) Structures or devices located in city. The emission of dense smoke in the city from the smokestack of any steam roller, steam derrick, steam pile driver, tar kettle or other similar structure or device, or from the smokestack or chimney of any building or upon any premises, except for nine minutes in any one hour during which period the firebox is being cleaned or a new fire is being built therein, is declared to be a nuisance.

(b) Locomotives. The emission of dense smoke in the city from the smokestack of any locomotive for a period of more than thirty seconds in any one period of five minutes, is declared to be a nuisance; provided, however, that stacks of locomotives moving trains of six cars or more shall be permitted to emit smoke for one minute in any five minute period; that the emission of dense smoke for a period not exceeding three minutes from the stack of any locomotive which is unexpectedly stopped by breakdown, signal or sudden emergency shall be permitted, and that stacks of locomotives in and about roundhouses shall be permitted to emit dense smoke for thirty minutes during the period when the fire is being built or rebuilt after cleaning.

(c) Steam Vessels in river. The emission of dense smoke upon the river adjacent to the city from the smokestack of any steam vessel for a period of more than five minutes in any one hour is declared to be a nuisance.

The number of minutes or seconds during which smoke may be emitted in any period as provided in this section shall be deemed to mean the aggregate number of minutes or seconds, and such minutes or seconds need not be consecutive. (1945, 11-52, (c)(d).)

Section 34-5 Standard for grading density of smoke; dense smoke defined.

For the purpose of grading the density of smoke, the Ringelmann Chart, as published and used by the United States Bureau of Mines, shall be the standard.

Smoke shall be considered "dense" within the meaning of this chapter when it is of greater density than Number 3 of such chart. (1954, 11-52, (g).)

Section 34-6 Order to abate nuisance.

The chief inspector of licenses and inspections may order any nuisance specified in Section 34-4 to be abated, and shall cause order to be served on the owner or person in charge of the property or thing upon or in connection with which such nuisance exists, or on such of them as can be found in the city. (1945, 11-52, (e).)

Section 34-7 Appeal from order.

If a person served with an order from the chief inspector of licenses and inspections, as provided in the preceding section, before the date specified in such order for compliance therewith, applies to the chief inspector to have its execution stayed or terms modified, it shall be the duty of the chief inspector to suspend such order temporarily and to allow such person a reasonable and fair opportunity to be heard and to present argument and proof against the execution of the order or in favor of its modification. (1945, 11-52, (e).)

Section 34-8 Abatement of nuisance by city.

If any person upon whom an order is served, as provided in Section 34-6, fails and neglects to obey such order in the manner and within the time specified by the chief inspector of licenses and inspections, in addition to any other penalty provided by law, such officer may cause such nuisance to be abated and the expense thereof shall be collected from such person by the corporation counsel in an action in the name of the city.

Section 34-8

It shall be the duty of the department of police to execute any order issued by the chief inspector under the provisions of this chapter when requested by him so to do. (1945, 11-52, (e).)

Section 34-9 Permit for construction or alteration of steam plants, etc.--required.

Any person who wishes to construct or alter any stationary steam plant, boiler or furnace in the city shall obtain a license so to do issued by the Bureau of Licenses and Permits and approved by the chief inspector of licenses and inspections.

The provisions of this section shall not apply to necessary or emergency alterations or repairs of a minor nature which do not increase the capacity of such a plant, boiler or furnace, or involve any substantial alteration in structure or any alteration in the efficiency or method of smoke prevention. (1945, 11-52, (b).)

Section 34-10 Same--plans and specifications to be furnished.

The applicant for a permit required by the preceding section shall furnish with such application a written statement with plans and specifications, in duplicate, giving the style and dimensions of such steam plant, boiler or furnace, together with the height and size of its stack chimney and the method or device to be adopted for the prevention of the emission of dense smoke therefrom.

The chief inspector of licenses and inspections shall keep one set of the application papers as a record of his office. (1945, 11-52, (b).)

Section 34-11 Same--issuance.

If the application for a permit and statement of plans and specifications accompanying such application are approved by the chief inspector of licenses and inspections, the Bureau of Licenses and Permits shall issue a permit for the construction or alteration of such steam plant, boiler or furnace. (1954, 11-52, (b).)

Section 34-12 Same--not to preclude prosecution of emission of smoke.

The issuance and delivery by the Bureau of Licenses and Permits of any permit for the construction, reconstruction, alteration or repair of any plant or chimney connected with a plant, shall not exempt any person from prosecution on account of the emission or issuance of dense smoke caused or permitted by such person. (1945, 11-52, (h).)

Section 34-13 Permits authorizing emission of smoke.

A temporary permit for the emission of dense smoke, covering a period not to exceed six months from the date of its issuance, may be issued by the Bureau of Licenses and Permits with the approval of the chief inspector of licenses and inspections, if the chief inspector is satisfied that public convenience requires it. (1945, 11-52, (i).)

CITY OF NEW HAVEN

An Ordinance Providing for the Regulation and Control of the Emission into the Open Air of Smoke, Dust and Odor.

Section 1 It is hereby declared that pollution of the atmosphere by smoke, dust, or odor is a menace and nuisance to the welfare and comfort of the people of the City of New Haven and a cause of extensive damage to property. For the purpose of controlling and reducing atmospheric pollution, it is hereby declared to be the policy of the City of New Haven to establish and maintain active and continuing supervision of combustion processes, and of the emission of certain harmful or objectionable substances into the atmosphere. The necessity for legislative intervention by the enactment of the provisions of this ordinance is hereby declared to be a matter of legislative determination. This ordinance shall be interpreted and construed so as to effectuate the above purposes.

Section 2 Definitions.

(A) Dust: - Air- or gasborne solid particles. This definition includes fly ash, cinders and soot.

(B) Fuel-Burning Equipment: - Any furnace, incinerator, refuse-burning equipment, boiler, water heater, device, mechanism, stack, structure, oven, stove, kiln, still or other apparatus used in the process of burning fuel or similar combustible material.

(C) Minor Alterations: - Work which involves no substantial change in design, capacity, process or character of effluent.

(D) Odor: - That property of a substance which affects the sense of smell.

(E) Open Air: - All space outside of buildings, stacks or exterior ducts.

(F) Open Fire: - Any fire wherein the products of combustion are emitted into the open air, and are not directed thereto through a stack or chimney.

(G) Person: - Any individual, corporation, partnership, association or any other organized group of individuals or the legal successor or representative, agent or servant of any of the foregoing, any department, bureau or agency of the City of New Haven, and any other public body or agency.

(H) Smoke: - Emission from a chimney, stack or open fire, or from the combustion or heating of fuel or refuse.

(I) Stack: - A smokestack, chimney, flue, duct or other conveyor for carrying products of combustion, or incomplete combustion, smoke, dusts or odors into the open air.

(J) Standard Commercial Equipment: - Equipment manufactured in quantity for the purpose intended and completely specified as to size, type and rating in catalogs and other printed literature readily available locally to officials of the City of New Haven.

Section 3 The Director of Public Health shall be responsible for the administration and enforcement of the provisions of this ordinance. He shall appoint an Air Pollution Control Engineer who shall be registered by the State Board of Registration for Professional Engineers. If eligible, the Director of the Bureau of Environmental Sanitation shall be appointed by the Director of Public Health as the Air Pollution Control Engineer. Said Air Pollution Control Engineer shall make such inspections and investigations as are necessary to administer and enforce the provisions of this ordinance. He and the Director of Public Health may delegate to other individuals, authority to make general or specified inspection and investigations on behalf of the City of New Haven. Where, in the judgement of the Air Pollution Control Engineer or the Director of Public Health, a test is required to establish compliance with Section 6, he shall require a test to be made pursuant to Section 11.

Section 4 The Mayor shall appoint an appeal board consisting of two ex officio members and five appointed members, one of whom shall have had at least five (5) years' experience in the ownership, management or operation of industrial or commercial enterprises. A quorum of the appeal board shall be four. The members of the board shall serve without compensation and the five members shall be appointed for a term of five years, except that of the initially appointed board, one member shall serve for one year, one member for two years, one member for three years, one member for four years and one member for five years. The ex officio members of the board shall be the City Engineer of the City of New Haven and the Building Inspector of the City of New Haven. No appointed member shall be interested in the sale to the public of any fuel or any combustion or smoke abatement device or any air pollution control device.

Section 5 No person shall cause, suffer or allow to be discharged or emitted into the open air smoke the shade or appearance of which is darker than that specified for the time or duration shown in Table I, which is annexed hereto and made a part of this ordinance. For the purpose of grading the shade, appearance or density of the smoke, the Ringelmann Chart, as published and used by the United States Bureau of Mines, which is hereby made a part of this Ordinance, shall be the standard, provided, however, that other charts having equivalent shades of grey, when viewed at the intended working distance for each may also be used, for the purpose of grading the shade, appearance or density.

TABLE I

TYPE OF INSTALLATION	LIMITING DENSITY, SHADE OR APPEARANCE OF SMOKE
A. Domestic installation, primarily for heating and hot water, in one and two family dwellings.	Not darker than Shade No. 1.
B. Installations, primarily for heating and hot water in apartment houses, office buildings, schools, hotels, loft buildings, hospitals and other installations of similar character.	Not darker than Shade No. 1 except that smoke not darker than Shade No. 3 is permitted for not more than a total of 4 minutes in any period of 30 minutes.
C. All other stationary installation.	Not darker than Shade No. 2 except that smoke not darker than Shade No. 3 is permitted for not more than a total of 4 minutes in any period of 30 minutes.

Section 6 The provisions of this Section shall not apply to Installations in use on the effective date of this ordinance whose stack height is 120 feet or more above ground level. Installations in use on the effective date of this ordinance whose stack height is less than 120 feet above ground level shall be exempt from the provisions of this Section upon the extension of the stack to at least 120 feet above ground level. All installations exempted as above stated shall comply with the provisions of this Section, when in the opinion of the Air Pollution Control Engineer the process or operation, in existence at that time of adoption of this ordinance, has been altered to affect the pollution of the air or discontinued. All installations made after the effective date of this ordinance shall comply with the provisions of this Section.

No person shall cause, suffer or allow to be discharged or emitted into the open air from any stack permanently installed in a stationary building or structure, or to pass a convenient measuring point in the connection from the source of dust to such stack, dust in the air or gases in excess of 0.85 pound of dust per 1,000 pounds of air or gases, and in excess of 0.20 pound of dust larger than that which will pass through a United States standard 325 mesh sieve per 1,000 pounds of air or gases. In the case of gases from combustion processes, the 1,000 pounds of gases shall be adjusted to 50% excess air. The amount of solids in the gases shall be determined in accordance with accepted engineering practices and procedures for sampling solids from gas streams.

Section 7 No person shall cause, suffer or allow to be emitted into the open air odor in such quantity as to create a public nuisance to the detriment of public welfare or health.

Section 8 No person shall construct, reconstruct, install or alter any fuel-burning equipment or any other equipment capable of emitting smoke, dust or odor into the open air until an application for installation permit, properly listing and identifying the equipment and stating the means provided or to be provided to assure compliance with Sections 5 and 6, has been filed in duplicate by the person, or his authorized agent, in the office of the Air Pollution Control Engineer, an application fee of $5.00 has been paid, and an installation permit has been issued by him; except as hereinafter enumerated and subject to these same exceptions, no person shall construct, reconstruct, install or alter any such equipment in such manner that it does not conform to such application permit. Plans and specifications of the installation may be submitted as a means of identification and explanation of the means of compliance provided or to be provided.

The following equipment, repairs and systems are excluded from the foregoing provisions of this section: -

(A) OIL-FIRED EQUIPMENT burning No. 1 and No. 2 fuel oil (as specified in Commercial Standard Specifications for fuel oils of the U.S. Department of Commerce, in its latest revision) when standard commercial equipment is used.

(B) GAS-FIRED EQUIPMENT when standard commercial equipment is used.

(C) SOLID FUEL-FIRED EQUIPMENT when standard commercial equipment is used and the maximum fuel input will not exceed 350,000 BTU per hour.

(D) EQUIPMENT which is not permanently installed in a stationary building or structure.

(E) REPAIRS AND MINOR alterations to previously approved equipment or to equipment installed prior to the effective date of this ordinance.

Section 9 The Air Pollution Control Engineer shall act on all applications within a reasonable time and shall notify the applicant in writing of his approval, conditional approval or denial of the application, or of the need for additional information. The denial of an application shall include the reasons therefor and shall not prejudice the filing of a further application without fee, meeting the objections so specified. Commencement of work covered by a conditional approval shall be deemed acceptance of all the conditions therein set forth.

Section 10 The Air Pollution Control Engineer shall be notified of completion of work for which an installation permit was issued immediately upon such completion and he, or someone specifically authorized and designated by him, shall promptly inspect the installation for compliance with the application, the permit, and the provisions of this ordinance. He may authorize and designate another qualified person to make such inspection in his behalf. The Air Pollution Control Engineer may, in his discretion, and pursuant to Section 11, require a test of the installation to establish compliance with Section 6.

Section 11 When under the provisions of Section 3 or Section 10 the Air Pollution Control Engineer shall require a test to establish compliance with Section 6, he may accept for this purpose a test conducted by a duly designated representative or agent of the owner of the installation; or he, or a person authorized and designated by him, may themselves conduct the test and shall be allowed access to the installation at reasonable hours for this purpose. He shall have authority to engage the service of specialists for the conduct of such tests.

Section 12 Any person taking exception to, or aggrieved by, any decision, ruling, or order of the Air Pollution Control Engineer, may take an appeal to the Appeal Board as established by this Ordinance. Such an appeal shall be taken within fifteen (15) days after such ruling, order or decision by filing with the Air Pollution Control Engineer a notice of appeal directed to the Appeal Board specifying the grounds thereof and the relief sought. A deposit of Five Dollars ($5.00) shall be posted by the appellant at the time of filing of the appeal to cover the costs of the hearing. The Air Pollution Control Engineers shall forthwith furnish to the Appeal Board all papers relating to the decision, ruling or order which is appealed. The Appeal Board shall set a date, not less than five days, and not more than ten days, after the date of filing of the appeal for the hearing and shall give notice thereof by mail to all interested parties. Such an appeal shall act as a stay of the decision, ruling, or order in question until the decision of the Board is rendered. The Board shall within the period of ten (10) days after the hearing affirm, modify or set aside the decision, ruling or order of the Air Pollution Control Engineer. The decision of the Appeal Board shall be binding on the Air Pollution Control Engineer. The appellant may appear at the hearing in person or may be represented by an attorney or agent. If the decision of the Air Pollution Control Engineer is affirmed by the Board, the costs shall be forfeited to the City of New Haven; if the decision is reversed, the costs of the hearing shall be borne by the City of New Haven, and the deposit refunded.

Section 13 No person shall burn any garbage, refuse or rubbish in an open fire within the City limits, except in such manner as prescribed by the Department of Fire Service.

Section 14 No person shall in any manner hinder, obstruct, delay, resist, prevent or in any way interfere or attempt to interfere with the Air Pollution Control Engineer, or any individuals to whom his authority has been duly delegated in the performance of any duty provided herein, or refuse to permit such persons to perform their duty by refusing them, or any of them, entrance to property or premises containing equipment or open fires discharging or suspected of discharging smoke, dust, or odor into the open air.

Section 15 All persons owning, operating, or in charge of or in control of any equipment or property who shall cause or permit or participate in any violation of this ordinance, either as proprietors, contractors, owners, lessees, tenants, managers, superintendents, constructors, installers, mechanics, repairmen, foremen, janitors, engineers, firemen, or otherwise, shall be individually and collectively liable for any penalties or punishment imposed by this ordinance.

Section 16 Any person convicted of violating any of the provisions of this ordinance shall be guilty of a misdemeanor and shall be punishable by a fine of not more than one hundred dollars ($100) or by imprisonment for not more than thirty (30) days or both for each offense. Each day's violation may constitute a separate offense.

Section 17 The Air Pollution Control Engineer may, in his discretion, issue a warning and give any violator an opportunity to correct the cause of the violation before filing a formal complaint. Due consideration shall be given by the Air Pollution Control Engineer for the failure to make alterations or modifications caused by governmental restrictions affecting materials.

Section 18 If any provisions of this ordinance or the application thereof to any person or circumstances is held invalid or unconstitutional, such invalidity or unconstitutionality shall not affect the other provisions or applications of this ordinance which can be given effect without the invalid provisions or applications, and to this end the provisions of this ordinance are declared to be severable.

Enacted by the Board of Aldermen May 4, 1953.
Operative and in effect May 23, 1953.

CITY OF NORWALK

AN ORDINANCE CREATING A COMMISSION ON SMOKE REGULATION AND REGULATING THE EMISSION OF SMOKE AND OTHER SOLIDS, GASES, OR FUMES FROM ANY CHIMNEY, SMOKE STACK OR OTHER SOURCE WITHIN THE CORPORATE LIMITS OF THE CITY OF NORWALK

Section 1 There is hereby created in said City a Commission on Smoke Regulation.

Section 2 Said Commission on Smoke Regulation shall consist of the Health Officer, the City Engineer and a member of the Council of the City of Norwalk, all of whom shall serve without pay, and shall be appointed by the Mayor and approved by the Council of said City.

Section 3 "Persons" as used in this ordinance shall mean individuals, partnerships or associations other than corporations. "Corporations" shall mean all bodies corporate, joint stock companies or associations, domestic and foreign, their lessees, assignee trustees, receivers and other successors in interest having any of the powers or privileges of corporations not possessed by individuals, partnerships, or unincorporated associations. "Chart" shall mean chimneys, smokestacks, structures and openings of any kind whatsoever, capable of emitting smoke. Smoke stacks on locomotive roundhouses shall be deemed parts of locomotives beneath them for the time being. "Smokeless Fuel" shall mean a fuel containing less than twenty-one percent (21%) of volatile matter.

Section 4 The production of emission within this City of smoke, fly ash or fumes, the shade of which is equal to or greater than Number 3 of the Ringelmann Chart, or which is so dense as to prevent seeing through it at the point of emission into the external air, from any stack or open fire, except that of a locomotive or steamboat for a period or for periods aggregating thirty (30) seconds or more in any period of three (3) minutes, is hereby prohibited.

Section 5 The production or emission within this City of smoke, fly ash or fumes, the shade of which is equal to or greater than Number 2 of the Ringelmann Chart, or which is so dense as to be dimly seen through at the point of emission into the external air, from any stack or open fire, except that of a locomotive or steamboat, for a period of one hour, and the emission of such smoke, fly ash or fumes from any locomotive or steamboat for a period or for periods aggregating four (4) minutes in any period of fifteen (15) minutes is hereby prohibited.

Section 6 No person or corporation shall construct, install, reconstruct, alter or repair any furnace, boiler furnace, stack or other apparatus connected with the stack, including portable apparatus, unless he or it shall make application in writing to the Commission on Smoke Regulation on the form furnished by the said Commission for a permit for such construction, installation, reconstruction, alteration or repair, and in and by such application shall give the plans and specifications, showing the style and dimensions of the furnace, boiler furnace, stack and/or other apparatus connected with a stack, intended to be used, a description of the building or part thereof in which such furnace, boiler furnace, or other apparatus is located including the means provided for regulating the temperature of such building or part thereof and ventilating the same, and generally all provisions made for preventing smoke, together with a statement of the kind of fuel proposed to be used and of the operating requirements to be made of the furnace or furnaces referred to therein, and unless such application shall be passed upon by the Commission on Smoke Regulation and approved in writing and a permit issued as hereinafter provided; provided, however, that minor or emergency repairs which do not involve any substantial alteration in the method or efficiency of smoke prevention, may be made without permit. Any application shall be approved or rejected within ten (10) days after it is filed in the office of the Commission on Smoke Regulation. Upon the approval of any application, a copy of which shall be left on file in the office of the Commission on Smoke Regulation, and upon the payment of the fees hereinafter provided, the Commission on Smoke Regulation shall issue a permit for the construction, installation, reconstruction, alteration or repair of such furnace, boiler furnace, or other apparatus.

Section 7 No person or corporation shall use or cause to be used any new or remodeled or reconstructed plant or apparatus connected with a stack, including portable apparatus, for the production of heat and/or power, unless he or it shall make application in writing to the Commission on Smoke Regulation on the form furnished by said Commission for a certificate to operate such plant or apparatus.

Section 8 It shall be unlawful for any engineer, contractor, or other persons or corporation to do the work of the constructing, installing, reconstructing, altering or repairing any furnace, boiler furnace, stack or other fuel-burning apparatus connected with stack, unless the person or corporation for whom such construction, installation, reconstruction, alteration or repair is being made has proper authority in the form of a permit from the Commission on Smoke Regulation for such work.

Section 9 It shall be unlawful for any person or corporation to use or cause to be used any new or remodeled or reconstructed plant or apparatus connected with a stack, including portable apparatus for the production of heat and/or power unless the person or corporation shall have proper authority, in the form of a certificate from the Commission on Smoke Regulation, for operating such plant or apparatus.

Section 10 For examination of an application for a permit and/or certificate for any such construction, installation, reconstruction, alteration or repair, or for operating of such plant or apparatus, the Commission on Smoke Regulation shall collect at the time of issuing such permit, for the use of the City of Norwalk, a fee or fees as fixed from time to time by the Council of this City for each unit of fuel-burning apparatus.

The issue and delivery by the Commission on Smoke Regulation of any such permit and/or certificate shall not be held to exempt the issued or delivered, or who is in possession of the same, or whose application has been approved, from prosecution on account of the production or emission of smoke hereby prohibited.

Section 11 The Smoke Commission shall keep all applications made, and a complete record thereof as well as of all permits and/or certificates issued. They shall keep a record of all smoke observations on all stacks and generally of the work done by the Commission on Smoke Regulation. All such records shall be open for inspection by the public at all reasonable times.

Section 12 The Commission on Smoke Regulation or any member of such commission shall have the right in the performance of their duties at all reasonable hours, to enter all premises from which smoke is being emitted or has been emitted, and any person who shall, after proper identification, deny admittance to such person or persons or interfere with him or them in the performance of his or their duties shall be liable to a fine not exceeding fifty dollars ($50.00).

Section 13 Any person or corporation violating any of the provisions of this ordinance shall, upon conviction, be fined not exceeding fifty dollars ($50.00), and each day's violation shall constitute a separate offense.

Section 14 The Commission on Smoke Regulation is hereby empowered to prepare and promulgate from time to time rules and regulations governing setting heights and setting methods of boilers, furnaces and stokers, sizes and construction methods of flues, breechings, chimneys and stacks, sizes and types of furnaces, stokers, boilers and other fuel-burning equipment, grate areas, use, size, number and type of steam air jets, or other smoke eliminating devices as determined by the kind of fuel to be used.

Section 15 The members of said Commission shall hold office for two years from their appointment and until their successors are appointed and qualified. They shall be sworn to the faithful performance of their duties. Any vacancy in said Commission shall be filled by appointment by the Mayor and approval by the Council.

Section 16 The fees to be charged by said Commission for issuing any permit or certificate under the provision of this ordinance shall be as follows: One dollar.

Section 17 All ordinances and parts of ordinances inconsistent herewith are hereby repealed.

Adopted by the Council of the City of Norwalk June 9, 1931.

Approved, Anson F. Keeler, Mayor

STAMFORD

The Stamford ordinance adopted in 1950 reads as follows:

ORDINANCE 21--AN ORDINANCE CONCERNING SMOKE ABATEMENT

Section 1 It shall be unlawful for any person owning, operating or in charge or control of any locomotive, steamboat, steam tug, steam roller, steam derrick, steam pile driver, tar kettle, still, or other similar structure or device, or of any building or premises, to cause or permit the emission of dense smoke, soot, or obnoxious fumes in the City of Stamford, in contravention of the provisions of this ordinance, from any smokestack, chimney or other device used for the emission of smoke, soot or obnoxious fumes.

Section 2 It shall be the duty of the building inspector to investigate all violations and complaints of violations of this ordinance; to collect evidence in regard to the same, and to present such evidence to the prosecuting attorney for his action.

Section 3 The use of bituminous or soft coal for the purpose of combustion within the limits of the City of Stamford is hereby prohibited, except as provided in this section.

Bituminous or soft coal shall be permitted for combustion purposes within the limits of the City of Stamford only if the combustion of same, proper mechanical or other contrivances are used in connection with such combustion so as to eliminate smoke, the precipitation of soot, or the precipitation of cinders within the city limits.

Section 4

(a) The emission of dense smoke, soot, or obnoxious fumes in the City of Stamford from the smokestack of any steam roller, steam derrick, steam pile driver, tar kettle, still, or other similar structure or device, or from the smokestack or chimney of any building or upon any premises, except for nine minutes in any one hour during which period the firebox is being cleaned or a new fire is being built therein, is declared to be a nuisance.

(b) The emission of dense smoke in the City of Stamford from the smokestack of any locomotive for a period of more than thirty seconds in any one period of five minutes, is declared to be a nuisance; provided, however, that stacks of locomotives moving trains of six cars or more shall be permitted to emit smoke for one minute in any five-minute period; that the emission of dense smoke for a period not exceeding three minutes from the stack of any locomotive which is unexpectedly stopped by breakdown, signal or sudden emergency shall be permitted, and that stacks of locomotives in and about roundhouses shall be permitted to emit dense smoke for thirty minutes during the period when the fire is being built or rebuilt after cleaning.

Section 5 For the purpose of grading the density of smoke, the Ringelmann Chart, as published and used by the United States Bureau of Mines, shall be the standard.

Smoke shall be considered "dense" within the meaning of this ordinance when it is of greater density than Number 3 of such chart.

Section 6 The building inspector may order any nuisance specified in Section 4 to be abated, and shall cause such order to be served on the owner or person in charge of the property or thing upon or in connection with which such nuisance exists, or on such of them as can be found in the City of Stamford.

Section 7 If a person served with an order from the building inspector, as provided in the preceding section, before the date specified in such order for compliance therewith, applies to the building inspector to have its execution stayed or terms modified, it shall be the duty of the building inspector to suspend such order temporarily and to allow such person a reasonable and fair opportunity to be heard and to present argument and proof against the execution of the order or in favor of its modification.

Section 8 If any person upon whom an order is served as provided in Section 6 fails and neglects to obey such order in the manner and within the time specified by the building inspector, in addition to any other penalty provided by law, such officer may cause such nuisance to be abated and the expense thereof shall be collected from such person by the corporation counsel in an action in the name of the City of Stamford.

It shall be the duty of the Department of Police to execute any order issued by the building inspector under the provisions of this ordinance when requested by him so to do.

Section 9 A temporary permit for the emission of dense smoke covering a period not to exceed six months from the date of its issuance, may be issued by the controller with the approval of the building inspector if the building inspector is satisfied that public convenience requires it.

Section 10 The penalty for the violation of this ordinance shall be a fine not exceeding fifty dollars for the first offense, and for each succeeding offense a fine not in excess of one hundred dollars shall be imposed.